Published Monthly SEP 19 1942

VETERINARY MEDICINE

OCTOBER 1942

CONTENTS

Veterinary Progress, Policies and Comment.....391-408

The 79th Annual Meeting of the American Veterinary Medical Association, including abstracts of many papers presented and reports rendered—also the award of the 12th International Veterinary Prize to Brigadier General R. A. Kelser, 391-403; Rats, Fleas and Cities, 404; Three Thousand Sulfonamide Compounds Available, 404; Dehydrated Beef Ordered, 404; Much Wool Available, 405; Consult Interest of the Majority, 405; Increased Sheep Production in Canada, 405; Brucellosis Control in Canada, 405; U. S. Imports Purebred Livestock, 405; A Milk Product Protects Milk, 406; Experience with an Ancient Animal Plague, 406; New Vaccine for Rocky Mountain Spotted Fever, 406; Louisiana Project for Control of Internal Parasites in Horses and Mules, 406; A Use Found for Lignite, 406; Fish Food for Fur Bearers, 407; Fur Farm for Raising Rabbits, 407; Gestation Period in Mink, 407; Number of Milk Goats in U. S., 407; Where Do Wild Foxes Get Vitamin A Reserves, 407; Tips for Your Farmer Clients, 408; Soybean Silage, 408; Trench Silo for Beet Tops, 408; An Economical Silo, 408.

Ileocecal Invagination in an Army Horse..... 409

Two Drugs I Need..... 410

The Efficacy of Phenothiazine for the Removal of the Cecal Worm of Chickens..... 412

Arteriosclerosis in a Clinical Case of Bovine Johne's Disease 416

There Can Be No Profit in a Diseased Animal..... 420

Veterinary Service of a Pack Train in Eritrea..... 421

Why Must and How Can Veterinary Service Be Extended 424

Autobiography of a Veterinary Practitioner..... 428

Placental Toxemia in Cows..... 433

Pyelonephritis in a Cow..... 434

Observations on Leptospirosis in California Dogs..... 435

Canine Tuberculosis 437

Pathological Testicle 437

Complicated Food Poisoning in a Dog..... 438

Sodium Chloride Poisoning in Cattle..... 438

Book Reviews 440-442

Stedman's Practical Medical Dictionary, 440; The Virus; Life's Enemy, 440; Immunology, 441; Animal Sanitation and Disease Control, 441; The Physiology of Domestic Animals, 441; Mammalian Structure, 442; War Medicine, 442.

VOL. XXXVII
No. 10

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879.

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KANSAS CITY, MISSOURI

VETERINARY MEDICINE

Registered in U. S. Patent Office

VOL. XXXVII OCTOBER, 1942 No. 10

Published Monthly by the
VETERINARY MAGAZINE CORPORATION
7632 S. CRANDON AVE., CHICAGO, ILL., U. S. A.

$4.00 a year; per copy 50 cents; Special Issues $1.00

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Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879. Entered as second-class matter under the title of American Journal of Veterinary Medicine July 19, 1910, at Chicago, Ill., under the Act of March 3, 1879.

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A.V.M.A. Holds Highly Successful Meeting

THE 79th annual meeting of the American Veterinary Medical Association, held in Chicago, August 24-27, 1942, was well attended (registration nearly 1700 and present at the annual banquet approximately 1000) exceptionally well managed and enjoyable from every point of view. Aside from the program the features attracting the most attention were the elaborate educational and commercial exhibits and of these, first place goes to the Army Veterinary Corps exhibit which, among other things of military interest, showed the type of food accepted by the army veterinary service for the personnel of the country's combatant forces. Concerning the importance of the responsibility of the army veterinary service for assuring that the military personnel receive only wholesome food, Brigadier General R. A. Kelser, chief of the service said: "No one factor has a greater bearing on the morale of the soldier than the adequacy and character of his mess—and no army in the world is better fed than ours. In carrying on a war food is just as essential as guns, planes, ships and munitions. It is important, not only in the army, but also to the civil population which must support and supply the army."

The Army Veterinary Corps food exhibit was prepared by Col. J. E. Noonan, Veterinarian, 6th Service Command, together with Allied Store Utility Company, American Meat Institute, A.V.M.A., Chicago Quartermaster Depot, C. V. Hill and Company, Inc., McCray Refrigerator Co., National Live Stock and Meat Board, Palmer House, Super-cold Corporation, U. S. Army Public Relations Office, U. S. Quartermaster Market Center and Universal Refrigerator Service.

At the annual election the following were chosen by acclamation: Charles W. Bower, Topeka, Kans., president-elect (will assume the presidency at the close of the next annual meeting); E. R. Cushing, Plainfield, N. J., 1st vice-president; E. B. Mount, Memphis, Tenn., 2nd vice-president; A. E. Cameron, Ottawa, Ont., 3rd vice-president; C. F. Schlotthauer, Rochester, Minn., 4th vice-president; Ward Giltner, East Lansing, Mich., 5th vice-president; M. Jacobs, Knoxville, Tenn., treasurer and C. C. Hastings, Williamsville, Ill., member at large of the executive board.

The president-elect was graduated from the Division of Veterinary Medicine, Kansas

Brigadier General R. A. Kelser, Chief of Veterinary Corps, U. S. Army, was awarded the 12th International Veterinary Prize

State College, with the class of 1918 and has practiced in Topeka, Kansas, since that date. He has been member-at-large of the Executive Board of the A.V.M.A. for the past five years and secretary-treasurer of the Kansas Veterinary Medical Association for a long period.

W. C. Glenny and many others assisted the general chairman, H. Preston Hoskins. Mrs. C. L. Miller (elected secretary-treasurer of the auxiliary) and local members, arranged the women's program.

The 12th International Veterinary Congress Prize for distinguished service to veterinary science, which is the veterinary profession's award of merit, went to Brig. Gen. R. A. Kelser, Chief of the Army Veterinary Corps.

The citation presented by Dr. O. V. Brumley, chairman of the association's executive board, stated that the award was made both because of General Kelser's work in the development of the Army's veterinary corps, and for his extensive research in the fight against livestock diseases both in this country and in the tropics.

"As a member of the Army Medical Department Research Board in the Philippines, General Kelser perfected a rinderpest vaccine which led to the eradication of that scourge from Philippine agriculture. General Kelser won special distinction when he discovered that the virus of encephalomyelitis is capable of being transmitted by the same mosquito (*Aedes aegypti*) which transmits yellow fever, other species of Aedes, and the *Culex tarsalis*.

"General Kelser helped to organize and later commanded the first Army veterinary laboratory in the country's history. Later he served as instructor in bacteriology in the Army medical school, and instructor of infectious diseases in the veterinary division of that school. Later he was detailed to additional study of virus diseases at Harvard University. He served as a member of the Army Research Board in the Canal Zone from 1935 to 1938, when he was appointed Chief of the Army Veterinary Service. Besides being the author of numerous articles on infectious diseases, he wrote a *Manual of Veterinary Bacteriology* which is widely used in colleges and universities.

"In making the award, the Association wishes to honor the command you have placed on so high a level, as well as you, General Kelser, who have made possible the important service the veterinarians of the United States are able to render to the armed forces."

President-elect W. W. Dimock, head of the department of Animal Pathology of the Kentucky Agricultural Experiment Station at the University of Kentucky, Lexington, was inducted as president at the close of the convention.

Doctor Dimock is internationally known for his research on the health problems of horses and sheep. He has been connected with the Kentucky Agricultural Experiment Station since 1919.

The new president was born at Tolland, Conn., is a graduate of the University of Connecticut, and was graduated from the New York State Veterinary College at Cornell University in 1905. In 1906 he went to Cuba where he was stationed for two years at the Cuban Agricultural Experiment Station. In 1908 to 1909 he was with the Cuban National Board of Health. Returning to the United States in 1909 he became a member of the faculty of the Veterinary Division of the Iowa State College, serving in that capacity 10 years until he joined the staff

of the Kentucky Agricultural Experiment Station.

Highlights from the program include the following excerpts from papers presented at the meeting.

Veterinarians Cooperate Willingly

Over 12,500 of the estimated 13,000 veterinarians in this country have already sent in their service questionnaires to the Procurement and Assignment Office in Washington. To date, they have come nearer to 100% response in heeding the request than members of any other profession.

The government recognizes that veterinarians have two big jobs in this war. One is to insure the health of the livestock of the nation and to inspect meats and other foods to see that wholesome food is provided. The other job is to provide veterinarians for the army and other governmental services. The task of the Procurement and Assignment Service is to see that these professional men are allocated where they can render the greatest service and make the greatest contribution to the war effort.

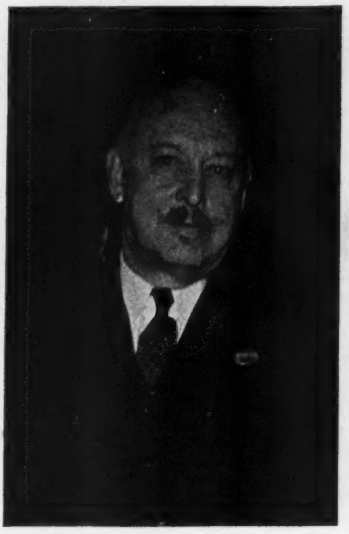
In each state, our department has a veterinary representative of war manpower who knows the essential veterinary needs. These men have been named as consultants to the selective service boards and when the army needs veterinarians we select and notify the men who fit the need.

In the meantime, we recommend that all veterinarians sit tight, stay on the job and perform their essential service until they are called.—*Col. Sam F. Seeley, Executive Officer of the Procurement and Assignment Service for Physicians, Dentists and Veterinarians.*

Program for Veterinary Support of the U. S. War Effort

The 12,000 veterinarians of this nation have the responsibility not only to control those livestock diseases already present in this country, but also to prevent the introduction of highly dangerous new ones from abroad. Let all of us, be on sentry duty, so to speak, for the detection of unusual disease conditions. Scientific research has disclosed the most vulnerable points at which to attack the various animal diseases and parasites.

L. A. Merillat, former President, later Executive-Secretary of the American Veterinary Medical Association and now Editor of the Journal of the American Veterinary Medical Association and the American Journal of Veterinary Research



John R. Mohler, Chief, B.A.I., U. S. Department of Agriculture, Head of the Committee of 11 experts who prepared the Yearbook of the Department

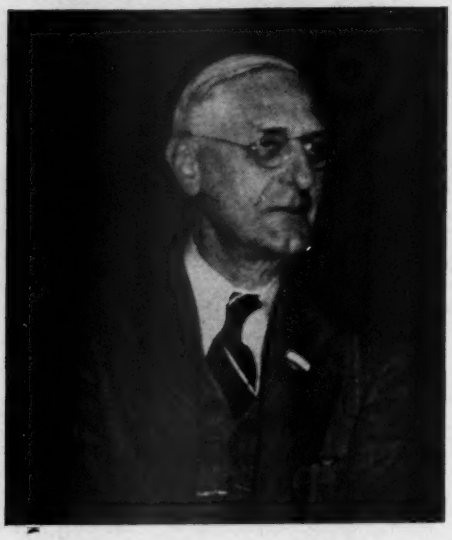
The seven-point program for the profession, to insure adequate and wholesome food supplies for United Nations' forces and the civilian populations as well includes:

Technical assistance to the armed services and war agencies; detecting new or unusual livestock diseases and conditions; prompt reporting of disease outbreaks to state and federal officials; aiding stockmen to improve sanitary conditions to provide protective barriers against infection; stamping out small centers of disease before they can reach large proportions; combating diseases which affect strategic materials, such as surgical sutures and shearling pelts needed for lining of aviator's suits and enlisting the cooperation of other groups in protecting livestock health.

Veterinarians should continue the efforts already started during peacetime, to stamp out livestock plagues which have been proving costly to animal husbandry in this country. These attainments will not only contribute to military victory, but also will improve the post-war resources of the United States and its allies.—*John R. Mohler, Chief of the Bureau of Animal Industry, U. S. Department of Agriculture.*

Responsibilities of Veterinary Profession

As veterinarians, we well know that only in so far as we can maintain our great herds, flocks and droves of food producing animals



W. W. Dimock New President of A.V.M.A.

in good health, can we meet the demands so vitally important to this war. What a better understanding there would be if our people could see the veterinarian out in the corn belt immunizing our hogs against cholera, eliminating tuberculosis, and freeing them of parasites. And out in the range country vaccinating our cattle against anthrax and blackleg, controlling and preventing hemorrhagic septicemia, eradicating the Texas-fever-carrying tick, and on the alert for the prompt detection and elimination of any other infectious diseases which might make their appearance and prove a menace. Among our vast dairy herds, they would observe him at his work with brucellosis, learn of his achievements in tuberculosis eradication, and mastitis studies and investigations.—*R. A. Kelser, Office of the Surgeon General, U. S. Army, Washington, D. C.*

The Veterinarian in Canada's War Effort

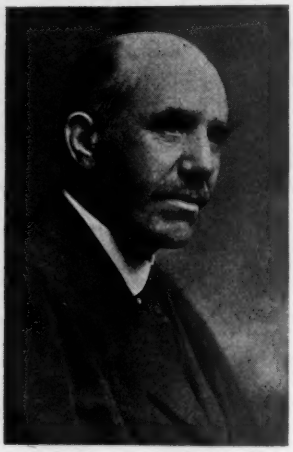
Canada has doubled her pork exports to Great Britain since the first year of the war, and is exporting fifty times her pre-war volume of eggs.

This is not advanced as an advertisement of Canada's agriculture, but to show the tremendously increased problem faced by the veterinary profession of Canada in meeting today's wartime responsibilities. High-pressure livestock production brings a long train of trouble in its wake.

Cows are being induced to produce quantities of milk far beyond nature's arrangements. Our poultry are producing eggs under artificial conditions which require special care in feeding to prevent the sacrifice of constitution and stamina.

In addition we must exercise constant vigilance against possible introduction of foreign livestock plagues, either under normal risks or as a deliberate sabotage of war.

These conditions are common to both the



Charles D. McGilvray, Principal, Ontario Veterinary College, Guelph

United States and Canada as joint allies fighting for our existence under standards of life which we consider essential.

There has never been a time in Canada's history when veterinary service was more important. Besides our greatly increased production of pork and poultry for war needs, our milk production has been increased 1,000 million pounds during the past year. The demand for wool and the increased price of lambs has also brought a large increase in sheep production.

Yet the adverse conditions which prevailed during the depression are still evident in some of the western provinces which are without adequate veterinary service. A large number of veterinarians in Canada perform work for the government, either directly or indirectly. In the case of part time veterinary inspectors their employment amounts

to a subsidy by providing work and payment outside of the fees they receive for normal veterinary practice. Some municipal councils have offered to guarantee a fixed income if a veterinarian will settle in the district.—*A. E. Cameron, Veterinary Director General of Canada.*

Prospective Veterinary Students

Although American colleges graduated 502 veterinarians in 1942, the urgent need for more veterinarians to protect the nation's livestock and to assure food supplies has led all veterinary colleges to adopt an "accelerated" course. By utilizing vacation time, the regular four-year course of study will now be completed in three years by veterinary students.

Some veterinary colleges are now experiencing a sudden rush of applications from prospective students from other fields, who wish to qualify for the practice of veterinary medicine. Many of these applicants are ill-adapted for veterinary practice, and present serious problems to the admissions committees. Included are graduates in medicine, dentistry, pharmacy and philosophy, and men in many biolcgical fields, who appear to have the delusion that veterinary medicine is a virgin field in which their abilites will be fittingly rewarded. They generally feel that scholastic aptitude is all that is required.

To insure competent veterinary service to the nation, these schools cannot select students upon the basis of scholarship alone. In other words, admissions committees should attempt to select candidates who will make good professional men, and not simply good students.—*Rept. Com. on Education, N. S. Mayo, Chairman, C. D. McGilvray, L. M. Hurt, E. T. Hallman and W. A. Hagan.*

Veterinarians Essential to Adequate Food Production

America is now doing the greatest meat-producing job in her history, to supply the tremendous quantities of food needed for ourselves and our allies.

Here are some of the gains we are making in this food-producing job:

Nearly one million more cattle than last year (a 22% increase over the 1932-41 average).

Nearly five million more hogs than last year—objective of the 1942-43 season is eleven million more hogs than the previous high record.

Few of us realize the tremendous part the veterinarian is playing in this job. His number one responsibility is to protect the health of the animals which are the foundation for our entire wartime food program. The welfare, security and the very existence of our nation depends upon control of farm animal diseases, and the successful completion of our war effort is directly dependent upon the production of food—milk, eggs, and meat.

Soldiers can be trained in a few months.

President-elect Charles W. Bower, Topeka, Kans.

Iron and steel that went into civilian uses can be turned into guns quickly. But veterinarians, like physicians, cannot be drilled or trained on short notice. Therefore we must muster our resources so that the full service of every veterinarian in the nation shall be completely available for this all-important job of producing the food necessary to assure our winning the war.

Every farm animal lost through livestock disease, and every meat carcass condemned, is a tax on our victory effort. Yet the yearly toll of such losses is staggering. We are losing at least 30 million dollars worth of marketed animals every year due to injuries, parasites, and disease—not counting the millions lost in animals which die on our farms from preventible causes.

In 1935, when over 28,000 beef carcasses were condemned because of tuberculosis, there were 26,000 hogs condemned for the same cause. Today, as a result of sound programs to wipe out this disease among our cattle, the condemnations for this cause among beef cattle have declined 89%. Dur-

ing the same time, the incidence in hogs has declined only 59%. The loss from tuberculosis in hogs in 1941 included 15,000 carcasses condemned, 238,000 parts condemned, and two million parts slightly infected. Nearly all this infection in hogs is due to the avian strain of tuberculosis. Thus it is logical to add another 12 million dollars to the losses in poultry, caused by avian tuberculosis.

There is another 13 million dollars waste each year due to bruising of livestock in shipment. A little extra care and more education in this respect would reduce such losses sharply. Our farms and ranches are producing more livestock than ever before in history, but the conditions under which this unprecedented volume is being produced make it especially susceptible to the ravages of disease and parasitic infestations. This means that the veterinary practitioners of the nation have the greatest job which they have ever faced ahead of them. In the food-production drive, we can surely say—"Veterinarians put the V in Victory."—*H. E. Kingman, Jr., Wilson and Company, Chicago.*

Livestock Transportation Regulations Archaic

America is 25 years behind the times in taking steps to prevent the spread of serious livestock diseases through livestock transported by trucks across the country and by farm animals sold at community auctions. The bulk of livestock now moves to market by truck, yet most of our sanitary shipping control laws were enacted prior to 1915, when livestock was moved to terminal markets by rail.

There are approximately 1500 local livestock auctions in 37 states. They handle over 50,000 head of livestock per year, per auction —or a total of 75 million animals annually —yet adequate disease inspection and control laws for most of these auctions are nonexistent.

With the constant movement of huge numbers of livestock from one area to another, and from farm to market, the opportunities for the spread of livestock contagions are infinite. For the welfare of the livestock industry it is vital that our sanitary control laws be brought up-to-date, to provide for proper inspection, proper cleaning of trucks, yards and vehicles, and proper rest and feeding of livestock hauled long distances by truck.

Livestock shipments by truck should have a bill of lading and be accompanied by a health certificate, just as is required of such shipments by rail. Specifications as to the unloading for feed, water and rest, as applied to the railroads, should apply also to truck shipments. Interstate shipments which are not accompanied by a health certificate should be required to have a special permit from the chief sanitary officer of the state of destination.

Nearly 70% of all hogs, 60% of all cattle and calves, and 30% of all sheep now go to market by truck. Yet our sanitary laws are

Congressman George W. Gillie, Indiana, responded to the address of welcome of W. C. Glenny, President of Illinois Veterinary Medical Association

still designed for the days when all this shipping was handled by railroads. It is imperative that we revise our laws so that all forms of transportation and all handlers of livestock shall be under the same livestock sanitary regulations—provisions concerning the cleaning and disinfecting of vehicles, proper inspection, and the resting and feeding of livestock en route. Anything less than this exposes our livestock industry to the constant threat of disease, spread from one area to another to the detriment of all livestock producers.

Livestock handled to concentration points by truck may have some disease that results in infected cars. Railway cars must be cleaned and disinfected under federal supervision but the conveyance (truck) that brought the stock to the railroad may continue operating without restriction—and thus spread infection. Partial transportation control is not effective.

It is urged that all states enact legislation for the regulation and supervision of sale barns. Such barns and sales agencies should be required to post a bond of not less than $10,000 to assure compliance with the law.—*Earle G. Reed, Livestock Agent, Omaha, Nebr.*

State Inspection Necessary to a Wholesome Meat Supply

State meat inspection in every state, as a public health measure, is an urgent need in this country.

The federal government provides veterinary inspection at all packing plants doing an interstate business, but those packers who sell only within the state in which they are located are exempt from such supervision. A system of state inspection is needed in all states to meet this situation.

State meat inspection, similar to that followed in federal inspection, has been conducted in California for 25 years. At present 411 establishments in 117 California cities operate under state inspection. Approximately 96% of all meat and meat products produced in California are inspected under federal, state, or state approved municipal meat inspection. The state inspection force includes nine supervisory veterinary meat inspectors, 112 veterinary meat inspectors, and 44 assistants.

This state inspection assures the public a wholesome meat supply, stimulates consumer confidence in the meat purchased, and permits small operators to slaughter close to livestock supplies.—*Arthur G. Boyd, Division of Animal Industry, Calif. Dept. of Agr., Sacramento.*

Equine Influenza

A species of influenza which attacks horses in army remount depots and which resembles outbreaks of human influenza is causing the army to lose many valuable animals. The Veterinary Research Laboratory at the Front Royal Remount Depot was established largely to develop methods for its control.

Equine influenza constitutes a serious problem in the assembling and conditioning of remounts for military service. The disease is very prevalent in remount depots and other places where young, susceptible horses and mules are collected in large numbers. Experiments conducted in our laboratory indicate that, like influenza in men and swine, it too is caused by a filtrable virus.—*T. C. Jones, V. C., and Fred D. Maurer, V. C., Front Royal, Va.*

Duration of Immunity from Encephalomyelitis Vaccination

Tests conducted on horses immunized against encephalomyelitis by both subcutaneous and intradermal vaccination, showed that full immunity to the disease was provided for eight months by the former—and the immunity produced by the latter was still persistent at 13 months although it appeared to be waning somewhat after that period.

Encephalomyelitis among horses has shown sharp increases in the past few years, and authorities have been fearful of a recurrence of the devastating losses which occurred a few years ago. The army has already had all of its horses vaccinated to protect them from

Harry W. Schoening, Chief of the Pathological Division of B. A. I., U. S. Department of Agriculture

the disease, and annual vaccination is more and more becoming a regular practice among many horse owners.—*H. W. Schoening, M. S. Shahan, L. T. Giltner and O. L. Osteen, Bureau of Animal Industry, U. S. Dept. of Agr., Washington, D. C.*

Threats to American Food Production Program

America faces two threats of sabotage to her meat producing drive to feed herself and her allies. There is the danger of enemy agents spreading virulent disease germs in our great livestock-raising centers. There is also danger of unconscious sabotage when livestock owners attempt to use drugs and serums (products which are dangerous except in skilled hands) which may establish new centers of infection.

Our losses due to livestock diseases may be well above $300,000,000 per year in this country. This could be enormously multiplied by intentional sabotage. The initial place to prevent such heavy losses in food supplies is right on the farms, where the animals are raised. In order to accomplish this a prompt and accurate diagnosis of livestock ailments should be made before they spread and reach serious proportions.

The veterinarian, because of his training and skill, is the leader upon whom we must rely to win these battles on the home front. If the war is to be won, man's war against animal diseases must be streamlined and speeded up. Only by so doing can we meet the food-producing responsibility which we face in this country today.—*Mark Welsh, State Veterinarian, College Park, Md.*

Veterinary Surgery on the Farm

In recent years veterinary medicine has made great strides in developing practical surgery for animals under actual farm conditions. A considerable number of cases of

Robert Graham, Head, Department of Animal Pathology and Hygiene, College of Agriculture, University of Illinois, Urbana

large animals where surgery is required can now be operated upon satisfactorily on the farm and with no more than the usual surgical instruments carried by the average veterinary practitioner. Such operations as cesarean section, teat surgery, omphalitis, dehorning, and others of similar nature, are now performed under farm conditions with excellent success.

The veterinary profession is to be commended for the great advance it has made in making modern surgical methods available to even the most remote farming areas, where proper livestock care was virtually unknown a generation or more ago.—*J. F. Bullard, Purdue Univ., Lafayette, Ind.*

Garbage Feeding Responsible for Trichinosis Problem

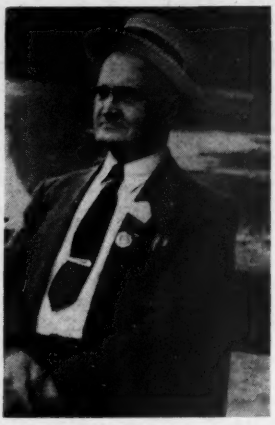
The feeding of uncooked garbage to hogs is the greatest factor in the spread of trichinosis in this country.

The incidence of trichinosis in hogs fed uncooked garbage is five times higher than in grain-fed hogs, as shown by the United States Bureau of Animal Industry survey. Yet this unpardonable but highly mercenary practice is still being tolerated, despite the fact that it is a menace to health and public welfare. It contributes nothing whatever to society and serves only to replenish the purses of those engaged in the practice.

A series of health control measures to cope with the garbage-feeding situation are needed. These would include:

Placing the feeding of garbage under the control of state livestock sanitary authorities; requiring a state permit to feed garbage to hogs; automatically quarantining hogs fed on uncooked garbage; requiring a permit before such hogs are sold; requiring a permanent identification tattoo on all hogs admitted to plants from places where uncooked garbage is fed; requiring slaughter houses using such hogs to pre-cook the meat before selling it to retailers.

Trichinae in pork are killed when all parts are heated to 137°F., a lower temperature than that at which milk is ordinarily pasteurized. In the interests of public health, it is not unreasonable to demand that commercial feeders subject garbage to such tempera-



E. S. Dickey discussed the Trichinosis problem, he is Head, Veterinary Department, John Morrell & Co., Ottumwa, Iowa

tures before giving it to hogs. Canada has such restrictions today, in fact no civilized country in the world, save the United States permits the feeding of raw garbage to food-producing animals. When the public is aware of the value of such regulations similar restrictions will be instituted in this country.—*E. S. Dickey, Ottumwa, Ia.*

Cause of Deaths in Baby Pig Disease

The same or an indistinguishable type of "irreversible or hyperglycemic coma" which occurs sometimes in human beings undergoing insulin shock treatment occurs in pigs being treated for "baby pig disease." In this disease, which has caused much concern among hog producers for several years, the pigs shiver and tremble, even to the point where they are unable to take nourishment.

These experimental results may hold the explanation for the failure of many newborn baby pigs, affected with so-called baby pig disease, to recover from hypoglycemic coma after repeated injections of glucose. Fasting pigs were found to be more acutely

affected by prolonged insulin coma than non-fasting pigs. However, deleterious effects occurred in both fasting and non-fasting pigs if the insulin coma was prolonged for several hours.—*Jesse Sampson and Robert Graham, Univ. of Illinois, Urbana.*

H. C. H. Kernkamp, Professor of Veterinary Medicine, Minnesota Agricultural Experiment Station, University Farm, St. Paul, has used sulfaguanidine successfully for enteritis in hogs

Treatment of Enteritis in Pigs with Sulfaguanidine

The sulfa drugs, which have produced such amazing results in coping with various human diseases, are proving equally beneficial in dealing with livestock diseases.

Sulfaguanidine is of definite value in treating necrotic enteritis in swine.

In cooperation with local practicing veterinarians twelve lots of pigs afflicted with enteritis were treated with sulfaguanidine. The results indicate that this drug possesses considerable merit as a therapeutic agent in the treatment of the infectious enteric complex. Among the treated animals 69% recovered, while among the animals not treated only 16% recovered. In another test lot of 133 affected pigs treated with sulfaguanidine, 92% recovered.—*H. C. H. Kernkamp and M. H. Roepke, Univ. of Minn., St. Paul.*

No. 2 Killer of Swine

Swine erysipelas, which now ranks second only to hog-cholera as a killer of American swine, is probably taking an unknown toll among the nation's turkey flocks as well.

From histories of losses in a number of flocks, it is believed that considerable erysipelas in turkeys has gone undiagnosed. Tom turkeys, which are in prime condition, apparently are very susceptible to the disease, although the incidence in hens is so low as to be almost negligible. Heaviest losses have occurred when accumulation of surface water was greatest. This leads to the inference that moisture conditions have a great deal to do with the development of the disease.—*J. E. Lindenmayer, Puyallup, Wash.*

Infectious Dysentery of Swine

Many farmers who have been blaming hog losses on the old, familiar swine disease, "necro" have in reality been losing hogs because of a virulent form of swine dysentery. The recognition of dysentery as a distinct disease will help to reduce the confusion and uncertainty regarding enteritis and "necro" in swine.

Dysentery affects hogs of all ages, but is particularly serious in the young. The death rate may vary from 10 to 90%. The disease is readily transmissible. There is evidence that brood sows may act as carriers of the infection. The constant postmortem finding in cases of the disease is colitis."

Quarantine and rigid methods of swine sanitation are the chief weapons available in controlling and stamping out dysentery in swine herds.—*L. P. Doyle, Purdue Univ., Lafayette, Ind.*

Johne's Disease in Farm Animals

Johne's disease is now believed to be a predisposing factor in many other disease conditions in cattle and sheep. The disease seems to affect virtually all farm animals, and is difficult to eradicate where various types of livestock are maintained in close proximity to one another. In a checkup of ten typical counties in Arkansas 355 cattle, 376 sheep, 63 goats, 24 swine, 35 horses, and 44 mules were found affected.

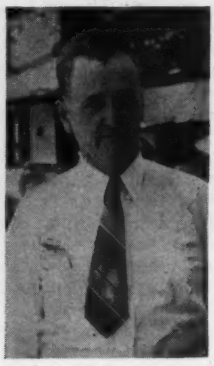
A program for the control of Johne's disease in cattle would be of little or no value unless consideration were given to other species of animals maintained on the same premises. Swine reacting to johnin have always been found associated with cattle or sheep. It may be coincident, but it has been possible to demonstrate acid-fast organisms in a high percentage of swine that have died of other infections.

The disease principally manifests itself in a disturbance of the digestive tract, and a pronounced emaciation of the affected animal. It appears to be much more widespread than is generally recognized, and may be responsible for much livestock illness which is now ascribed to other causes.—*D. F. Eveleth and Rebecca Gifford, University of Arkansas, Fayetteville.*

Balanced Rations and Livestock Production

American farmers can come close to supplying all the meat and poultry requirements of the United Nations war effort, without adding another cow, pig or chicken to their herds and flocks by simply following proper disease-control and nutrition practices.

A great many failures in efficient livestock production are due to the farmers' failure to give their livestock complete, balanced rations, including needed vitamins, proteins and minerals. If complete rations were supplied to all livestock and poultry, the production increases would be truly enormous.



L. P. Doyle, Department of Veterinary Science, Purdue University, Lafayette, Ind., recommended quarantine and rigid sanitary measures in Infectious Dysentery in Swine

Night blindness in cattle and horses, scours and pneumonia in calves, spongy hoofs in horses, reproductive disorders, rickets, and many other conditions are due to vitamin deficiencies. If the farmer would let his veterinarian help him work out a well-rounded ration, including the proper vitamins, many of these conditions could be completely avoided.

Mineral deficiencies also are common in many classes of animals—especially deficiencies of calcium and phosphorous. Supplemental iodine is also needed in certain parts of the country. Some Florida sows have been shown to be deficient in iron. Feeds grown in certain sections of Michigan are deficient in cobalt. Veterinary science has determined a great many of these deficiencies. Mineral supplements for the diet should be worked out for various sections of the country, in the light of these findings.

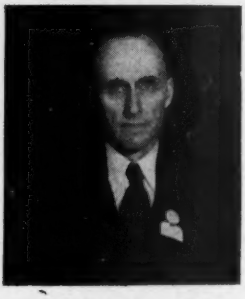
Most farm animals get insufficient protein. Sometimes this is because the farmer thinks that protein poisons an animal. Yet at the Ohio Station we have fed diets containing as high as 50% protein to pigs without harmful effect. Nor does the protein supplement of the ration need to be of animal origin. It has been found that certain vegetable proteins are just as good for this purpose as animal proteins.

We must keep in mind constantly that we are at war and that the food responsibility of the United Nations rests upon us. The farmer and the veterinarian, working together, with a sound program of disease control, and a program of balanced livestock feeding, can meet our enormous food production goals. But these goals cannot be met unless we do have such programs and the full cooperation of both groups.—*R. M. Bethke, Univ. of Ohio, Columbus.*

Iodine Treatment for Mastitis

A new method of attack against bovine mastitis, which is now costing dairy farmers millions of dollars annually, involves the use of iodine in mineral oil. The iodized oil is injected into the udders and milk cistern of the cow while she is "dry," and is generally allowed to remain there through the dry period.

However, the mere treatment of mastitis cases as they arise will not eradicate the infection within a herd. Presence of the disease in a herd indicates that infections exist in cows which are not suspected of harboring the disease. Mastitis eradication requires thorough diagnosis, classification of all animals in the herd, proper management and proper treatment of infected animals by a skillful veterinarian. Anything less than such a program will only result in confusion and failure.—*D. A. Sanders, Florida Agr. Exp. Sta., Gainesville.*



E. R. Frank, Professor of Surgery, Kansas State College, Manhattan, was commentator on Bovine Surgery

Digestive Disturbances in Cows

In my opinion more than 75% of all dairy cows over five years of age are suffering from gastritis due to the ingestion of foreign bodies. This is due to pure carelessness on the part of the owners. Cows have a curious tendency to swallow bright or shiny objects lying around the barnyard. If every farmer would spend a little time in picking up objects such as nails, pieces of glass and other injurious articles, he could prevent the loss of many valuable animals.

Nails and needles and other sharp objects penetrate the stomach and usually ultimately reach the heart, and when they do, of course, kill the cow.

Where digestive disturbances created by such objects are noted in time, they can be relieved by surgery. Usual symptoms show the

animal to be "off feed," eating best every two days or three days. When going down hill there is a distinct grunt.

Food crops grown on run-down or mineral deficient soil are bound to be lacking in essential minerals. If those minerals are not added to the rations in one form or another, livestock will suffer and I believe that such deficiencies are responsible for more digestive disorders in livestock than is realized by the public.

Modern veterinary surgery is constantly saving many dairy cows which suffer from food impactions, intestinal stoppages, and kindred disorders. In this respect, veterinary practitioners throughout the country are rendering invaluable service by saving irreplaceable animals and keeping them on the production line—producing butterfat needed for the war.—*M. R. Blackstock, Spartanburg, S. C.*

L. D. Frederick discussed the Economic and Nutritional Importance of Bovine Hepatic Disturbances. He is Chief Veterinarian, Swift & Co., Chicago, Ill.

Chemotherapy in Mastitis

In an attempt to determine the value of chemotherapy in the treatment of mastitis, three hundred and eight quarters were treated with such agents as acriflavine, entozon, colloidal silver oxide, and tyrothricin. Cows that were lactating, and others that were "dry" were treated.

In the lactating quarters, acriflavine was found to have 89.3% efficiency in destroying streptococcus infections; entozon 60%, colloidal silver oxide 71.4%, and tyrothricin 51.4%. In dry quarters the efficiency of acriflavine was 71.4%, entozon 72.7%, colloidal silver oxide 69.9%, and tyrothricin 92.1%.

Although response of the infected quarters to acriflavine and entozon is comparable in efficiency to other agents used, tissue irritation, damage to the udder, and lowered milk production appear to be greater with these agents. Tyrothricin was apparently the least irritating of any of the products used.—*C. W. Bean, Univ. of Maryland, W. T. Miller and J. O. Heishman, B.A.I., U. S. Dept. of Agr.*

James Farquharson, Professor of Surgery and Clinics, Division of Veterinary Medicine, Colorado State College, Fort Collins, presided at section on Surgery and Obstetrics

Idiopathic Hemoglobinemia of Cattle

A disease that appears to be new is causing heavy losses to cattle raisers in Oklahoma and other beef-producing regions. This disease, "idiopathic hemoglobinemia," is similar to "red water," but is different pathologically.

The death rate among several thousand Oklahoma beef cattle was approximately 100% among untreated animals. All attempts to isolate a causative pathogen, or to reproduce the disease in common laboratory animals and cattle, have been unsuccessful. The best results, thus far, in treating sick animals have been obtained by an intravenous injection of an arsenic solution.—*H. C. Smith, Oklahoma A. & M. College, Stillwater.*

Menace of Disease in Poultry

Plans to aid American farmers in producing the 700,000,000 dozen additional eggs required this year to meet wartime food goals require a reduction in the mortality of laying hens. An attempt to increase the number of such hens merely by adding new members to the flock will not achieve the desired result since we will immediately confront a serious poultry health problem, due to crowding. We do not have the new buildings needed to accommodate larger flocks. We know that crowding decreases egg production, increases the mortality rate and that both these factors operate to defeat the desired goal.

Adult poultry mortality has doubled in the last 20 years. We can reduce this high mor-

tality, if we will employ the knowledge available to us in modern veterinary science. The ways to reduce these losses lie through improved disease control, breeding, feeding and management.

Cliff D. Carpenter, Chairman, Special Committee on Poultry Diseases, A.V.M.A.; Pathologist, Allied Mills, Inc., Fort Wayne, Ind.

The Department of Agriculture has endorsed the program of our committee, and copies of the plan have been issued to all state agencies, extension departments, state colleges, and poultry organizations.

The committee outlines some of the more important research work in the field of poultry disease control which has been carried on by veterinary scientists during the past year. Among the latest developments are:

1. Discovery of a filtrable virus association with pullet disease or "blue comb."

2. Use of a saline solution to check the rise in blood sugar in cases of coccidiosis.

3. Use of phenothiazine in combating cecal worms of turkeys.

4. Discovery of a new respiratory disease of poultry in Rhode Island, which resembles infectious bronchitis but is of longer duration.

5. Findings to show that early maturing pullets over a 10 month period have less than half the mortality rate of the late maturing.

6. Milkweed was found to be toxic to turkeys, in a series of tests conducted by Colorado research workers.

7. Psittacosis has been diagnosed in chickens and pigeons, indicating that these birds may constitute sources of infection for man.

8. Cornell research workers are investigating the possibilities of developing strains of poultry which, through heredity, will have a greater resistance to disease.

A warning that the dangerous Newcastle disease may become established in this country as a result of increased traffic between the west coast and regions in the Pacific, was sounded in the committee report. Diagnosticians should be on the alert for evidence of Newcastle disease, since respiratory symptoms seen in this disease might be confused with native respiratory diseases, and thus enable Newcastle disease to become established here.

The report also urged pathologists to be on the alert for outbreaks of encephalomyelitis in pheasants and pigeons, and of psittacosis in pigeons and chickens, because of the public health aspects of these birds being possible reservoirs of infection.—*Rept. Com. on Poultry Disease, Cliff D. Carpenter, F. R. Beaudette, O. A. Brandly, T. M. DeVries, E. M. Dickinson, K. W. Stouder, and F. C. Tucker.*

New Disease of Poultry

A poultry disease occurs which cannot be distinguished clinically from infectious bronchitis, but which is of longer duration and has a longer period of incubation. In tests made on incubating eggs, the disease caused the death of from 25 to 50% of the chick embryos, after 24 hours of incubation.

The egg-propagated virus of the disease was capable of infecting both mature birds and young chicks after an incubation period of 7 to 14 days. The duration of the infection varied from 4 to 8 weeks in individual birds.

An interesting feature of the disease is the fact that birds which have recovered from it are susceptible to infectious bronchitis, and birds which have recovered from bronchitis, are equally susceptible to this new disease.—*J. P. Delaplane, College Station, Texas.*

Importance of Water in the Diet

A hog requires 550 pounds of water to produce 100 pounds of pork.

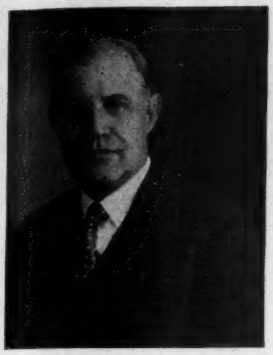
One hundred heavy laying hens will drink nearly 10 tons of water in a year.

A laying pullet has been observed dipping her beak in the water for 57 consecutive drinks after breakfast.

These are instances of the role water plays in livestock raising.

It has been shown that watering dairy cows twice daily produces 7% more milk than watering them once a day. The benefits in better livestock health and increased production which are to be gained from proper watering practices are equally significant in proper feeding practices.

Scientific rations should include proteins, carbohydrates, fats, minerals and vitamins. Proteins repair tissues and build new ones. Carbohydrates are the preferred body foods for muscular energy. Fats are carriers of valuable vitamins, and provide a source of



R. F. Vermilya was assisted, as chairman of general entertainment, by H. E. Kingman, Jr. Both are veterinarians with Wilson & Company

energy per gram two-and-one-half times that of carbohydrates and vitamins. Minerals are essential to the vital processes of the body, and are important to the skeletal structure, the nervous system and blood. Vitamins are essential to body maintenance, growth, health and reproduction.

It is not sufficient, however, to merely have these various ingredients in a ration. Quality of the ingredients is an important factor. For example, in a carefully controlled feeding experiment, pigs from the same litter were divided into two groups, and received rations of the same formula and chemical analysis. At the end of the 20-week experiment, the pigs in one group weighed an average of 21 pounds more than the others. The difference was due to the quality of the ingredients. Similar tests have been conducted with chickens and turkeys, and the differences were equally striking.

Veterinary research has made great strides in improving the nutrition of farm animals and poultry. The local veterinarian is performing an outstanding service in bringing the results of this research to rural communities throughout the nation.—*Cliff D. Carpenter, Fort Wayne, Ind.*

Throat Infections in Dogs

Many cases of illness in dogs which are sometimes ascribed to other causes, actually originate in throat infections. Included among these are gastroenteritis, respiratory infections, some types of eczema, cankered ears, various low grade inflammations and some cases which might be confused with distemper.

Among the symptoms of throat infections in dogs are coughs, incessant swallowing and gulping, red and inflamed eyes, and high temperatures accompanied by dullness and lack of appetite. In extreme cases, it is desirable to remove the dog's tonsils. However, in the majority of instances, the best treatment consists of painting the throat with silver nitrate until the infection has cleared up. For internal medication, sulfa compounds seem most effective.—*Paul White, Indianapolis, Ind.*

One section of the extensive exhibit of the Army Veterinary Corps. All cuts of beef, veal, pork, mutton, lamb and other foods of animal origin were exhibited in showcase refrigerators, and on top were displayed large photographs, showing various processes in the manufacture of the foods. Col. Noonan at right

Rats, Fleas and Cities

Pasteurella pestis infection is widely prevalent among the rodents of the western third of the United States; having spread from the West Coast over that vast territory in a generation. It has already reached the Great Plains and may be expected to

***Ctenocephalides canis* (Curtis), head of male. This flea has been found in houses, on the cat, fox, rabbit, rat, woodchuck, man, etc., and is capable of carrying disease from animal to man**

continue eastward to the Atlantic Seaboard.

P. pestis is the cause of human plague or black death which in two years (1347-49) spread over the whole of Europe killing one-fourth of the population including half the inhabitants of England. The year 1661 saw the beginning of another great pandemic of plague, that spread from the Middle East to the Atlantic Coast. In 1664 more than 69,000 persons died of this disease in London alone. In 1842 plague started in China and spread almost around the world reaching San Francisco in 1900. It has caused but few deaths in the Mountain States, because of the sparse population and the infrequency of intimate contact between the inhabitants and house rats, thus giving fleas which convey the germ from animal to animal and from animals to man little opportunity to wreak the havoc it may easily cause in rat-infested centers of population.

The *P. pestis* possesses its old time potential for destroying populations—almost for wrecking civilizations. This motivates the great effort the U. S. Public Health Service is making to develop a vaccine or other prophylactic agent for menaced communities. In the absence of such an agent disaster can be avoided only by anti-rat campaigns which require public support to be effective. Widespread plague infection among the rats of any of our large cities would do more in a decade to eliminate shacks, raze tenements, clear alleys and implement a rat-proofing building code than civic pride can effect in a millennium.

* * * *

New virus diseases may arise by the transfer of a virus to a new host or conceivably by the development of parasitic habits by a non-parasitic virus, if such exists.—*Smith.*

* * * *

There are more than 3000 sulfonamide compounds available for biological investigation. Of these but a half dozen have secured general recognition for their therapeutic properties and only three—sulfanilamide, sulfapyradine and sulfathiazole—have received world-wide acceptance. Sulfaquanidine is achieving popularity rapidly in this country and some others are being increasingly used. Phenothiazine, not a sulfa compound but a related substance, has of course achieved wide use in veterinary medicine.

* * * *

Dehydrated Beef Ordered

The U. S. Government placed its first order for dehydrated beef recently—for 80,000 pounds. The process of dehydration involves pre-cooking of cubed steak at low temperatures immediately followed by grinding and drying by a slow continuous operation. When compressed and placed in sealed tin containers it occupies but one-tenth the space in shipping that is required by refrigerated carcasses. It does not need refrigeration. The addition of water restores it to the consistency of fresh ground meat. It may be served as meat loaf, patties, hash or in any other way that ground beef can be used. Swift & Company, which developed this process for dehydration, were awarded the order.

Much Wool Available

The Government owns a larger stock of wool imported from Australia and South America than any which has ever before existed in this country. The wool textile industry has been working twice the ordinary rate but available supplies of wool have tripled. Freighters which have hauled soldiers and supplies to Australia, have returned with cargoes of wool. It is estimated that 1,100,000,000 pounds (twice the normal yearly consumption) will be available. However, since it takes 200 pounds of wool to outfit a new enrollee in the Army (civilians ordinarily require five to ten pounds) and since much will doubtless be used in Lend-Lease, the present stock will not be a surplus.

Why Not Consult Interest of the Majority?

A. H. Lauterbach, manager of the Pure Milk Association, Chicago, in speaking to the American Farm Bureau Federation, said: "If farmers turn their problems over to the government, the government will eventually solve these problems in the interest of the consumers only, because consumers represent a majority."

Consumers now pay from 15½ cents up per quart for milk; the farmer gets about 5½ cents. Milk wagon drivers get more than the farmer. In many cities, since the war began, milk deliveries have been cut to once daily and none on Sunday by cooperation between companies, thus securing elimination of duplicate deliveries, and consequent large savings have been made; but as yet none of these savings have been passed on to the consumer.

Canada plans to produce at least a million more sheep in 1943 than this year because of the increased need for wool for its armed forces. A program of twice yearly dipping for the control of external parasites is being fostered by the Dominion Government.

Investigations at the Missouri Agricultural Experiment Station showed that the carrying capacity of an acre of corn is increased 50% by making it into silage for wintering steers. The Colorado Agricultural Experiment Station found that an acre of corn fed to cattle as dry fodder was worth $38.31 under the conditions of their experiment while an acre of corn as ensilage was worth $52.65.

Bovine Brucellosis Control in Canada

In Canada vaccination against brucellosis in cattle is in the hands of veterinarians exclusively. Strain No. 19 vaccine is used and in official vaccination only calves four to eight months of age are vaccinated. Vaccinated calves must be given an agglutination test after 30 days and any which fail to show a positive reaction are revaccinated. An official program of brucellosis control is in effect in Ontario, Quebec, British Columbia and Alberta.

U. S. Imports Purebred Livestock

The Tariff Act of 1930 provides for free entry of purebred stock from foreign countries when its pure breeding is certified to by the B.A.I. During the fiscal year ending June 30, 1942, such certificates were issued for 20,247 animals—an all-time record and 6% more than that of the year ending June 30, 1941, which was 27% more than for the preceding year.

The principal gain was in the importation, mainly from Canada and Mexico, of cattle, especially Holstein-Friesian, Jersey, and Ayrshire. Smaller numbers came from England, Ireland, New Zealand, several South American and other countries.

A Milk Product Protects Milk

A new lacquer, made from milk, is now being used to take the place of tin on milk cans and those used for condensed milk. This lacquer was developed by the Bureau of Dairy Industry, U. S. Department of Agriculture from lactic acid, obtained by fermenting the milk sugar in whey and then adding castor oil or soy bean oil. Production of the lacquer is expected to be started by several manufacturers immediately.

But Contemporary Experts Called Them Crackpots

Darwin, a theologian and geologist, wrote the "Origin of Species." Pasteur, a chemist, advanced biology and medicine more than all the biologists and physicians who preceded him. Dolton, a physicist, made the most important contribution of his time to chemistry. Mayer, a physician, made possible great advances in physics.

Experience With an Ancient Animal Plague

I was called hurriedly to Western Canada (1901) due to an epizootic of anthrax among sheep on the '76 Company range, where approximately 35,000 animals were grazed. Twenty-five hundred were dead when I reached the ranch. Dr. J. C. Hargrave, who later became Chief Veterinary Inspector of Alberta, joined me. We instituted a method of moving healthy sheep each day to fresh ground. Vaccination with a commercial vaccine was commenced. Unfortunately it proved to be insufficiently attenuated and 500 deaths occurred following its use. A new lot of vaccine was procured and the remaining 32,000 were vaccinated twice during a period of three weeks. The outbreak occurred over an area 25 miles wide and 75 miles long near Swift Current, Saskaschewan. Curiously no anthrax has appeared in the area since. Perhaps this is because there were no earthworms in that region, for gophers inoculated with earth taken from a dump, where the carcasses of sheep dead of anthrax were thrown, died of the disease.—*Reminiscences,* Chas. H. Higgins in the *Journal of Comparative Medicine,* 6:6 pp. 159-162.

A new vaccine for Rocky Mountain spotted fever as well as a serum for persons already affected with the disease is now being produced[1] through license of the U. S. Public Health Service. Heretofore they have been available only at the federal laboratories at Hamilton, Montana.

The Louisiana Agricultural Extension Service and the Louisiana Veterinary Medical Association are cooperating with the farmers of the state in a project for the control of internal parasites in horses and mules.

Just five years ago a program was undertaken in five parishes (counties). During the past year 22 parishes participated and 19,000 horses and mules were treated. Community worm treating days have proved popular with the farmers who bring their worm infested stock to a central designated point for a given area. A veterinarian is in charge of each center and treatment for the animals is obtained at a nominal fee.

Instructions to the owners on the importance of control of parasitic infestation is given them by a member of the animal husbandry department of the University of La.

A Use Found for Lignite

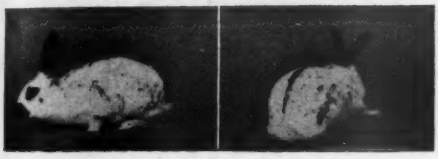
Lignite, an heretofore little used carbonaceous substance existing in large masses in various sections of the country, has been found to be adaptable for the cheap and abundant manufacture of hydrogen—a gas which for defense purposes has manifold uses. The lignite is heated to incandescence and steam (H_2O) is passed over it. This process cracks the molecule, thus liberating hydrogen and oxygen. The oxygen combines with the carbon of the lignite and forms carbon monoxide (CO), which is easily removed, leaving the free hydrogen. Lignite for this purpose does not require such a high temperature as coal or coke, report scientists of the University of Minnesota, to whom a patent has been granted which has been assigned to the University.

[1] Lederle Laboratories is the first commercial organization to apply for and receive license to make the vaccine. Sharp and Dohme make serum for treatment of the disease.

Fish Food for Fur Bearers

During the past year onlachons (candle fish) have been used extensively as food for fur producing animals, according to reports made to the Dominion Department of Fisheries by its chief officer on the Pacific coast.

Onlachons are small fish with a high oil content which school in large numbers along the Pacific coast, principally in April and May. They get the name "candle fish" from their brilliant glow when dried.



Use Fur Farm for Raising Rabbits

The Fish and Wildlife Service of the U. S. Department of Agriculture urges an increased production of rabbits and better care of the pelts of trapped wild rabbits. Twenty-five percent of the imports of rabbit fur have been cut off by the war, reducing hatter's supplies to a point where substitutes must be used.

Scientific methods of trapping wild and of raising domestic rabbits are explained in bulletins issued by the Wildlife Service.

In England a move has been started to utilize the buildings on discontinued mink and fox farms for rearing rabbits. Rabbit-raising has not been discontinued in England, as has the production of finer furs, because in addition to producing an essential fur, rabbits are an economical food.

Rabbit drives are more than recreation now in the Prairie States. Because the normal supply of wallaby and rabbit skins from Australia is cut off by war in the Pacific, pelts of cottontails and jack rabbits will line aviators' jackets. In Nebraska jack rabbit pelts sold last winter for 15 cents apiece. A common method of hunting jack rabbits is to drive a car into an alfalfa field where the jacks feed at night. Confused by the lights, they are easily shot with a .22 rifle.

Gestation Period in Mink

The length of the gestation period in the mink has long been a subject of controversy and a basis of mysteries. R. G. Enders of the Bureau of Biological Survey, as a result of the observation of a small number of carefully-checked pregnancies, reported that the gestation period is from 41 to 42 days. Dr. E. Rendle Bowness reported, in *American National Fur and Market Journal* for May, the duration of 862 pregnancies on which the mink owners kept complete records. The gestation periods varied from 39 to 76 days with parturition occurring on the 44th to 57th day in 90% of the cases. The reason for the apparent extreme variation in the gestation period in mink is as yet unexplained.

Milk Goats in U. S. Number 118,000

The preliminary report of the sixteenth census (1940) of the United States for agriculture shows a total of 33,232 farms reporting 118,896 goats milked. The designation "goats milked" probably includes some goats other than the improved dairy types. The first eleven states ranked in order of total number of goats milked are as follows: California, 12,012; Colorado, 8,979; Arizona, 7,735; Texas, 7,560; New Mexico, 7,150; Oregon, 6,690; Missouri, 6,398; Washington, 5,848; Arkansas, 5,815; Oklahoma, 4,033; Pennsylvania, 2,538.—*Certified Milk*

Where Do Wild Foxes Get Their Vitamin A Reserves

The fact that wild foxes have 100 times more vitamin A in their livers than ranch-raised foxes is a puzzle to scientists. The facts have been reported by Dr. Arthur D. Holmes and Francis Tripp of Boston, and Frank G. Ashbrook and Chas. E. Kellogg of the Fish and Wildlife Service.

The ranch-raised foxes were studied from birth to death and even autopsied. They were healthy and their fur in perfect condition. Several of the most scientific fox diets were used in the tests but the results were always the same — about 1/100 the vitamin A reserve of wild foxes.—*Amer. Fur. Breeder.*

Tips for Your Farmer Clients

Now is the time the farmer must consider winter feed for his large increase of livestock. Give him these pointers and it will rebound to your benefit.[1,2,3,4]

It is of interest to note (because of the difficulty in obtaining the A.I.V. supplements, phosphoric acid and molasses) that after extensive tests the U. S. Bureau of Dairy Industry has announced a method for the production of grass silage without these ingredients if the moisture content of the material does not exceed 68%.

The grass should be chopped fine and put into a tight silo, topping it with three feet of unchopped green material. Warm weather will ordinarily wilt and dry the grass to the desired moisture content for silage but if the cutting is made during cloudy or wet weather or the cut grass is exposed to rain; he should run dry hay, ground corn or corn-and-cob meal into the silo along with the grass. Such procedure if carried out as recommended will reduce the moisture content to the proper level.

Soybean Silage

The best time to harvest soybean for silage is when the seed is partly developed but before the plant starts to lose its leaves. However, at this stage of growth, according to the Ohio experiment station, the plant contains too much moisture for good silage, as the dry matter content is then only 20 to 25%. There is a decided improvement if, after cutting, the plant is left to wilt or partially dry before being gathered. One day of good sunny drying weather is usually sufficient, bringing the dry matter content up to 30 to 35%. Corn, and hay also, have heretofore been mixed with the soy bean when packed into the silo, but if the bean plant has been allowed to partially dry it may be used alone. The station has found that soy bean and hay crops can be successfully ensiled without adding preservatives, or at least with much smaller applications than have been used in the past.

[1] U. S. Dept. Agri. Technical Bul. 611T, Methods of making silage from grasses and legumes—10c; [2] U. S. Dept. Agri. F1820, Silo types and construction—10c; [3] U. S. Dept. Agri. 578F, The making and feeding of silage—5c; [4] U. S. Dept. of Agri. Yearbook separate, Losses in making silage and hay—5c.

Trench Silo for Beet Tops

Sugar beet tops are fed fresh to sheep and cattle in England. Surplus tops are made into silage which, unlike that made of grasses, does not require molasses. The tops are heaped into a shallow pit or trench; the larger the area the less the waste. For a crop of 200 tons of tops, the trench should be one foot deep, 12 feet wide at the bottom, 14 feet wide at ground level and 100 feet long.

An Economical But Effective Silo

Straw silos for corn, Atlas sorgo or sorghum have been used in Virginia for several years. They seem to be economical and satisfactory for ensiling roughage; besides, they have flexibility and may be built in the field where they are to be used.

Baled straw and plenty of No. 2 wire are all the material needed. The ground is leveled and the bales for the first layer are placed end to end as close as possible to form a circle. Three strands of wire are passed around each layer of bales and drawn fairly tight. Since it is impracticable to build this type of silo very high, it is advisable to make it from 12 to 20 feet in diameter. A 20-foot silo built to a height of 20 feet will hold approximately 100 tons of corn silage. This type of silo has the advantage that it can be filled as it is built. The silage keeps well, has a good color and odor. The bales absorb juices from the fermenting grain stalks so they can be taken down as the silage is used and fed to cattle. Where there is light rainfall sorghum, which does not require as much moisture as corn, is largely used for silage.

The use of the straw silo is an economical way to save pasture clippings and also the first cuttings of alfalfa, which usually contain many weeds and do not make good hay. In such a silo all of the soybean plant can be used; the stalks and coarser stems are chopped up and made palatable. Ordinarily only about 25% of the plant (the leaves and light stems) is used for soybean hay.

Ileocecal Invagination in an Army Horse*

By MAJOR A. J. RALSTON, R.A.V.C.

History.—The patient, an Australian mare, 11 years old, had been under treatment for four days for spasmodic colic while in camp. Although the usual purgatives had been administered, no feces had been passed. The animal was evacuated to a hospital by motor ambulance.

Symptoms.—On admission to the hospital the symptoms were those of intermittent

Picket line at an Army Veterinary Hospital

sub-acute colic. The pulse was weak and accelerated, visible mucous membranes injected and icteric, temperature normal. There was loss of appetite and a tendency to retention of the urine.

The presence of an intestinal calculus was suspected, but rectal examination proved negative. The symptoms continued for six days, during which time only a few pellets of feces were passed. Pain was never very acute. The animal frequently lay down in the box and appeared dull; almost comatose. The head was often directed toward the flank.

Treatment.—This consisted of the administration of antispasmodics in linseed oil, followed at intervals by full doses of magnesium sulphate and later by warm normal saline solution by stomach tube. Enemata were given at frequent intervals and the catheter passed as required. On the 6th day after admission to the hospital (10th day after onset of symptoms) the patient remained down in a comatose condition, and as there appeared to be no hope of recovery, was destroyed.

Post-mortem examination revealed that approximately two feet of the ileum was invaginated into the cecum. On making a longitudinal incision through the invaginated portion of the gut a pedunculated fibrous tumor about the size of a duck egg, with a fairly wide base of attachment to the intestinal mucous membrane, was revealed. In its original position the tumor must have been situated a few inches anterior to the ileocecal valve. The invaginated portion was dark red as a result of vascular congestion, but there was no sign of necrosis. The tumor was examined at the Imperial Veterinary Research Institute, Mustekar, and reported upon as follows: "The tumor proved on histological examination to be a soft granuloma. The presence of eosinophile cells and its origin from the sub-mucous coat indicated a development similar to the habronemic 'tumor' of a horse's stomach, although no parasites could be found on sectioning."

It is interesting to note that no Habronema were discovered throughout the intestinal tract post mortem. The case is an interesting one on account of the symptoms being prolonged over a period of 10 days and the fact that constipation was such a marked feature throughout, also the absence of necrosis on necropsy.

From these facts it may be deduced that the primary symptoms of colic were due to the irritation and mechanical obstruction caused by the presence of the rapidly developing granuloma and that the initial purgative may, by stimulating peristalsis, have been responsible for the subsequent invagination.

* *Jnl. Royal Army Veterinary Corps.* 12:8, pp. 154-155.

Two Drugs I Need

By R. H. SMITH,
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I was called to the country to treat a cow for an old-time negro a few days ago. He was telling me about, long years ago when he knew one of the old-time "hoss doctors." No matter what mistake old "Doc" made he could always explain it. One time old "Doc" was taking a horse's temperature and had the thermometer in the horse's rectum with the wrong end sticking out. One of those present thought he had old "Doc" for once and called his attention to it. The ready explanation was, he had put it in that way to push the mercury back.

I want to push the mercury back and write about two medicaments I have needed badly during all the many years I have practiced. I need them just as badly today.

1. I need a good purgative that can be given by mouth and will act in the large animal within four to six hours.

2. I need a long lasting hypnotic that is safe and will bed a large animal down for at least six hours.

I do not know the answer, but hope some time someone will produce these agents and make the treatment of large animals easier and more effective.

Maybe the anatomical differences between the large stomach and long gut of the cow and the small stomach and large gut of the horse make it impossible for any drug, or combination of drugs, to supply my needs as to the purgative.

A purgative given by mouth that will really unload the intestinal canal of either of these animals requires from 12 to 24 hours when they are constipated and that is usually when I want to give a purgative.

The physician has lots of purgatives that when given by mouth will act in from one to three hours (castor oil, magnesium sulphate, sodium phosphate, calomel and many others). However, none of these or any other drug I know of will produce the required result under usually 18 hours in large animals. No wonder many horses and cows die from impactions.

Our fast acting purgatives like arecoline, eserine, barium chloride, lentin and others I am afraid to use in impactions. They recall the old woman who went to the cyclone cellar with the rest of the family while the storm passed. When they came out, grandma looked over her specks and could not see anything, then under them and then through them. The house was gone! The barn was gone!—even the three holer was gone! After due consideration she said; "Take it up one side and down the other the Lord does about as much damage as he does good."

There is a place for these quick-acting cathartics, but they are dangerous under many conditions and the longer I practice the more I am afraid to use them.

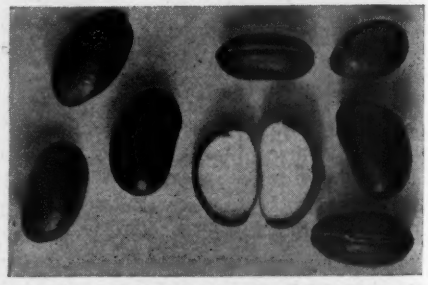

Fig. 1. Eserine is an alkaloid secured from the calabar bean—the seed of the palm, *Physostigma venenosum*, which occurs in the East Indies and the Malay Archipelago

They evacuate only the back bowels. They cause much more pain, more rolling of the animal and therefore more strangulated and ruptured guts than the original ailment. They also retard or neutralize the action of any sedative we may have given.

There are two kinds of calls that cause me to drive hard and fast. One is colic in a horse and the other is when I am told over the 'phone that the animal is bleeding to death. If I don't hurry a good many of the colic cases will be well and grazing when I get there and in the other cases the bleeding will have ceased and I won't get credit for arresting it. Eserine, arecoline, etc., have been given a lot of credit

in cases that were about well when injections were given.

I learned about "bleeding to death" a few weeks after graduating and putting up my shingle. That was in the horse and buggy days. I got a call to come out in the country about seven miles to a horse that was "bleeding to death." I jumped into my buggy and drove hard over country roads

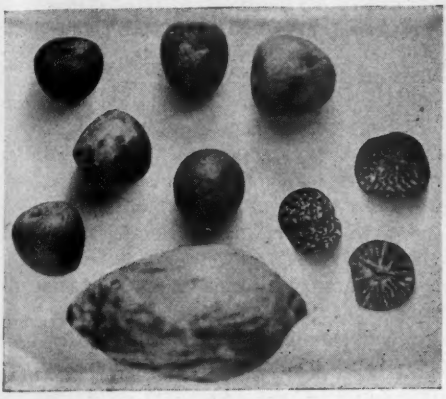

Fig. 2. Arecoline is likewise an alkaloid but is obtained from the betel nut—also the seed of an East Indian plant, *Areca catechu*

to get there as soon as possible. I was nearly there when I remembered I had forgotten my shiny new medicine case and my instruments, but the good Lord takes care of fools. When I got there the bleeding had stopped. Since then I take enough time to carry along my medicine case and instruments, but I still drive hard to the cases mentioned.

I want the new and better purgatives for impaction of stomach in cattle and of the large bowel in horses. Where there is a severe constipation, and the animal lies flat out on its side after eating too much woody feeds like straw, coarse hay and cane, but doesn't look so awfully sick, no drug that I know of will act in these cases under 18 to 24 hours when given by mouth and the fast acting drugs will likely kill the animal before it can get well. I know of no hypnotic or sedative that will last over a duration of longer than two hours, in animals with a large spinal cord and a small brain. Usually they are quiet only about 30 minutes, and that is not long enough for me to get home, to say nothing of getting to bed and catching up on some sleep.

Cannabis Indica was a fairly good hypnotic. Four to six drams intravenously

Fig. 3. I drive hard when I get a call to attend an animal that is "bleeding to death," otherwise the bleeding may have ceased when I get there and I will not be given credit. Eserine and arecoline have received credit in a lot of cases that were about well when injections were made

would give the animal sweet dreams for a few hours but then we got to cultivating the drug in this country. "Cannabis Americana," I never thought did as good a job as the Indica. Then the government banned the drug from commerce because people were misusing it. Chloral hydrate is a good hypnotic but altogether too evanescent; lasting only about an hour. The same holds with the barbituric acid compounds.

The M.D. gives a hypo of morphine sulphate or a combination of morphine with other drugs and his patient quits worrying about his income tax for six to 12 hours. When I lull one of my patients with any hypnotic I know of, he will get ants in his pants in about an hour and around and around he will go. I long for the day when I will have a dependable hypnotic of long lasting action and a purgative that will dump them from mouth to anus in a few hours. It reminds me of the atheist who was shot in a fight. As he lay wounded waiting for a doctor to come he asked all who came near to pray for him. Asked why he wanted to be prayed for when he did not believe in a God he said, "Well there ought to be one in a case like this."

The Efficacy of Phenothiazine for the Removal of the Cecal Worm of Chickens[1]

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GRAYBILL and Smith (1920), Tyzzer, Fabyan and Foot (1921), and Tyzzer (1934) have demonstrated that "blackhead" may be produced in disease-free turkeys by the feeding of embryonated eggs of *Heterakis gallinae*, the cecal worm of poultry. This fact alone establishes the cecal worm as a dangerous parasite and a means for its control is, therefore, highly desirable.

Hall and Shillinger (1923) found that a mixture of oil of chenopodium and cottonseed oil, administered rectally, removed approximately 90% of the heterakids from chickens. McCulloch and Nicholson (1940) treated a total of 26 naturally infected chickens with phenothiazine, administered either in capsules or in the feed. The birds were given either single or repeated doses of 0.05, 0.1, 0.5, or 1.0gm of the drug. Although these authors did not attempt to determine the dosage that would give optimum results they concluded that between 0.05 and 0.5gm was a satisfactory individual dose. Repeated administrations of the drug in capsules appeared to be slightly more satisfactory than putting the drug in the feed. McCulloch and Nicholson concluded that "the average effectiveness was between 95 and 100%, both from the standpoint of cecal worms expelled and killed." They observed that most of the worms not removed by the drug were apparently killed, so far as could be judged by the absence of motility, when the parasites were placed in water at 45°C. at the time of necropsy of the host birds. Roberts (1940) administered single doses of phenothiazine to chickens at the rate of 0.4 and 1.0gm per pound body weight and in three successive doses of 0.33gm per pound body weight; the efficacies of these dosages were 29.4, 94.1, and 87.0%, respectively.

The work described here was undertaken in order to obtain further information concerning the efficacy of phenothiazine for the removal of *H. gallinae* when administered in repeated doses of 0.05, 0.1, and 0.5gm.

Materials and Methods

Thirty-eight Rhode Island Red and five White Leghorn chickens ranging in age from eight months to one year, and naturally infected with *H. gallinae*, were used. These birds were obtained from experimental plots and from a farm in the vicinity of Beltsville, Md. Each experimental chicken was given either 0.05, 0.1, or 0.5gm of phenothiazine on each of four consecutive days. The drug was administered in hard gelatin capsules to all but two of the chickens; these were given the drug in tablet form. Five of the Rhode Island Red chickens were retained as infected controls and were given empty capsules at the time of treatment of the experimental birds. The droppings from each bird were collected 24 hours after each

Turkeys fed embryonated eggs of *Heterakis gallinae*, (the cecal worm of poultry) developed "blackhead."

[1] The experiments reported in this paper were conducted in the fall of 1941 at the United States Department of Agriculture, Beltsville Research Center, Beltsville, Md.

treatment and examined for worms after washing them through three screens, the finest of which was 40-mesh. At necropsy the gut and cecal contents of the first 13 birds were screened before being examined but the cecal contents of the others were washed out in a large volume of water, the supernatant fluid decanted, and the residue examined for worms. Unless otherwise indicated in the table, all chickens were necropsied the day following the last treatment. Worms recovered from droppings and at necropsy were tested for motility in tap water held at 45 to 50°C. All birds except those numbered 1314 and 1349 were weighed daily from the time of the first treatment until necropsy.

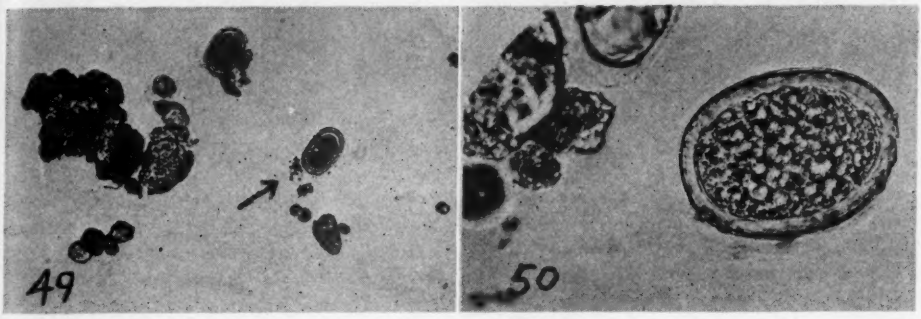

Fig. 49. Eggs of *Heterakis gallinae*, the cecal worm of chickens. x 100. Fig. 50. Same as Fig. 49. x 400.—Benbrook

Experimental Data

As shown in Table I, 9 birds received 0.05gm; 16, 0.1gm; and 13, 0.5gm of phenothiazine for four consecutive days. The percentages of mature or nearly mature worms expelled from the treated birds, calculated on the basis of the total number of worms removed from each group, were 12.9, 91.7, and 99.8%, respectively. The data indicate that both the 0.1 and 0.5gm dosages caused the expulsion of a large proportion of the worms and hence were more effective than the 0.05gm dosage. A comparison of the results of treatment with 0.1 and 0.5gm of phenothiazine by the chi-square test[2] showed that the difference between the percentages of worms removed by these two dosages, although small, was highly significant. During the course of the experiment the five control birds passed a total of 14 worms or 4.8% of their total worm burden.

Discussion and Conclusions

Phenothiazine, as administered in the experiment discussed in this paper, had no significant lethal effect on the unexpelled worms. Our observations in this respect are at variance with those of McCulloch and Nicholson who reported that 1,055 out of 1,178 worms obtained at necropsy were dead. In our experiment, only 40 out of 325 worms obtained at necropsy appeared to lack motility when placed in warm water. The possibility remains that some of those which were not motile when tested may have been alive. Some of the worms expelled in the droppings after treatment were found alive.

At necropsy only mature or nearly mature worms were recovered when the cecal contents were washed through screens before being examined. However, when the cecal contents were examined without screening, many small, immature worms, nine of which averaged 2.8mm in length, were recovered in addition to the larger specimens. These small worms were not considered in evaluating the efficacy of the drug because it was discovered that such worms could pass through the screens and, therefore, may have been lost in the daily routine examinations.

However, another factor may account for the fact that these small worms were found only at necropsy. It may be that the immature worms were not acted upon by the drug perhaps because of their location in

[2] The data were analyzed with the assistance of Mr. A. G. Dinaburg.

TABLE I.

RESULTS FOLLOWING ADMINISTRATION OF REPEATED DOSES OF PHENOTHIAZINE TO CHICKENS NATURALLY INFECTED WITH *Heterakis gallinae*.

Bird number	Initial weight	Weight on day of last treatment	Dosage of drug	Worms expelled on successive days of treatment				Total worms expelled	Mature worms recovered at necropsy	Percentage of worms expelled
				1	2	3	4			
	(grams)	(grams)	(grams)							
338	2946	3000	0.05	9	0	1	1	11	0	100
361	2727	2619	0.05(2)	1	0	1	0	2	0(1)	100
374	2023	2120	0.05	1	0	0	1	2	16	11.1
396	2290	2390	0.05	0	22	3	1	26	0(1)	100
648	968	909	0.05	2	0	0	0	2	36	5.3
695	780	865	0.05	1	0	0	0	1	5	16.6
1314	1615	1426(3)	0.05	9	0	0	0	9	0	100
1942	1657	1678	0.05	18	2	0	0	20	0	100
1984	1117	1088	0.05	0	5	2	1	8	503	1.6
Total	16123	16095		41	29	7	4	81	560	12.9
152	2137	2191	0.1	61	113	14	4	192	11	94.6
304	1675	1771	0.1	2	2	9	2	16(5)	11(1)	59.3
334	2630	2726	0.1	48	12	0	1	61	0(1)	100
369	1858	1926	0.1	3	1	0	0	4	3	57.1
383	2397	2420	0.1	137	47	31	3	218	6	97.3
942	3322	3073	0.1	19	2	3	0	24	0	100
959	2321	2276	0.1	32	8	4	0	44	20	68.8
999	2707	2647	0.1	3	10	3	1	17	0	100
1200	2509	2529	0.1	53	20	5	2	80	16	83.3
1322	1787	1785	0.1	2	0	0	0	2	0	100
1349	2161	2031(3)	0.1	4	0	0	0	4	0	100
1780	2702	2753	0.1	7	1	0	0	8	0	100
1872	3108	3165	0.1	1	14	2	5	22	7	75.9
1973	1117	1151	0.1	0	0	1	0	1	0	100
3749	1914	1956	0.1	95	22	0	0	116	0	100
3756	2820	3033	0.1	1	6	0	0	7	0	100
Total	37165	37433		468	258	72	18	816	74	91.7
197	2825	2837	0.5	13	0	0	0	13	0	100
318	1632	1641	0.5	0	3	0	0	3	0(1)	100
359	2871	2950	0.5	6	6	1	0	13	0(1)	100
391	1586	1659	0.5	9	3	0	0	12	0	100
398	2912	2961	0.5	18	7	1	0	26	0	100
450	2145	2034	0.5(6)	0	0	1	0	1	0	100
820	3061	3158	0.5	3	0	0	0	3	0	100
981	3439	3284	0.5(6)	1	3	2	0	6	0	100
1196	2548	2558	0.5	2	0	0	0	2	0	100
1795	2120	2137	0.5	35	4	0	2	41	0	100
1796	3187	3246	0.5	2	58	45	0	105	1	99.1
3750	2940	2988	0.5	0	55	2	0	57	0	100
x	2415	2448	0.5	198	11	1	0	210	0	100
Total	33681	33901		287	150	53	2	492	1	99.8
321	2777	2855	—	0	1	1	0	2	48	4.0
324	1987	2068	—	2	0	0	0	2	49(1)	3.9
325	2669	2395	—	0	0	4	0	4	20	16.7
333	2547	2590	—	1	0	2	0	3	92	3.2
368	2227	2207	—	0	0	0	0	3(4)	68(1)	4.2
Total	12207	12115	—	3	1	7	0	14	277	4.8

(1) Necropsy on 8th day. (2) Treated 3 days. (3) Weighed on day following last treatment.
(4) Two worms recovered on 5th, one on the 6th day. (5) One on 5th day. (6) Drug given in tablet form.

the mucous membrane of the ceca. The fact that Baker (1933), Tyzzer (1934), Roberts (1937), and others have observed small, immature specimens of *H. gallinae* closely associated with the glandular crypts of the cecal mucosa suggests this possibility. Also, Roberts (1940) failed to recover any immature heterakids after treatment with phenothiazine but reported that several were found at necropsy.

McCulloch and Nicholson (1940) reported that phenothiazine given in doses up to 500 times the smallest amount found to be therapeutically effective had no apparent harmful effect on the fowl. Meriweather (1941) presented data to show that the administration of phenothiazine in single doses as small as 0.5gm reduced the hemoglobin content of the blood of chickens and that this decrease was most noticeable 48 hours after administration. He stated, however, that there was a gradual rise in the hemoglobin content of the treated birds immediately following this 48-hour period. On the basis

of these observations, Meriweather concluded that the effect of phenothiazine was ". . . evanescent or of no consequence in the fowl."

The results of the present experiments indicate that phenothiazine was apparently not seriously harmful to the fowl. The weight data showed that there was a slight gain in mean weights of all the treated groups during the 48 hours immediately following the administration of the drug and only in the group given 0.05gm dosages (group receiving the smallest amount) was there a slight loss in mean weight gain at the end of the 4-day period of treatment.

Five of the birds which were fed 0.5gm dosages of phenothiazine harbored 22 specimens of the large roundworm of poultry, *Ascaridia galli*. Fourteen of these were removed during the course of treatment. Also, fourteen of 26 specimens of this species were removed from six chickens treated with the 0.1gm dosages.

Rhode Island Reds and White Leghorns were used in the experiment. The phenothiazine had no significant lethal effect on the unexpelled worms nor did it seem to affect the chickens adversely

Summary

1. Phenothiazine, administered for four consecutive days at daily dose rates of 0.05, 0.1, and 0.5gm removed 12.6, 91.7, and 99.8% respectively, of the mature or nearly mature *H. gallinae* from naturally infected chickens.

2. On the basis of the data presented, 0.5gm was the most effective of the three dosages tested.

3. Phenothiazine had no significant lethal effect on the unexpelled worms.

4. On the basis of the weight data there is no evidence to indicate that the drug affected the chickens adversely.

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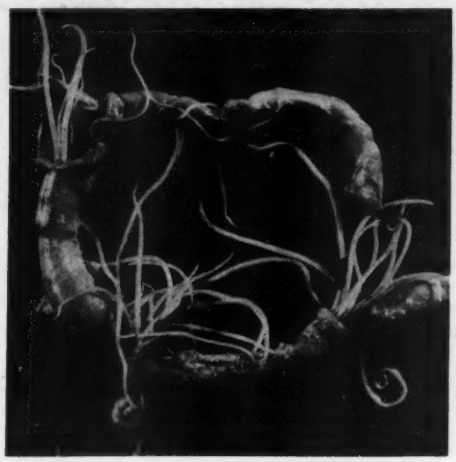

Intestine of a six-month-old chicken dead from a heavy infestation of the large round worm (*Ascaridia galli* or *Ascaridia lineata*)

Arteriosclerosis in a Clinical Case of Bovine Johne's Disease*

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THE pathology of Johne's disease in cattle has been described by numerous investigators. For the most part the lesions mentioned have been confined to those in the gastro-intestinal tract and the adjacent lymph nodes. Hagan (1), however, has reported finding calcareous plaques in the intima of the aorta and pulmonary arteries of three long-standing cases of Johne's disease. Hallman and Witter (2), Hastings, Beach, and Mansfield (3), M'Fadyean and Sheather (4), and others have described the lesions of Johne's disease in detail without mention of accompanying arterial calcification.

Moore, Hallman and Sholl (5), found cardiovascular calcification apparently identical with the type sometimes seen in Johne's disease, in calves fed diets low in magnesium. Their article makes no reference to the possibility that paratuberculosis might have been present in the experimental calves.

Fig. 1. Hereford Cow No. 60 on August 1, 1941

During the past two and one-half years 35 cattle have been examined in this laboratory for the evidence of Johne's disease. This group included animals dying of clinical Johne's disease and other infectious diseases, and also fat animals killed for meat purposes. Typical acidfast organisms were simultaneously demonstrated in smears taken from the intestinal mucosa of 14 of these cattle. Evidence of arteriosclerosis has been found in only one of these cases. This proved of sufficient interest to warrant further description.

Case History

A purebred Hereford cow, No. 60, was born November 21, 1938. She was bred on March 3, 1941. On September 17, 1941, she aborted a six month fetus and retained the placenta. On September 19th the uterus was examined, and a uterine capsule containing picric acid, boric acid, and iodoform was inserted. On September 20th the placenta was removed manually, and capsules of iodoform and boric acid were inserted. At this time the cow began to lose weight rapidly. She ate very little, although different tempting feeds were placed before her.

On October 10, 1941, the cow developed a severe diarrhea strongly suggestive of Johne's disease. Sodium iodide and calcium borogluconate were given by intravenous injection. The cow was very stiff, and her back was markedly arched. She held her forefeet too far back, and kept her hind feet too far forward. The diarrhea stopped within a few days, and the cow was turned back onto pasture.

On November 21st the patient was so stiff that it was frequently necessary to assist her when she attempted to get up. Once up, she was able to walk only with a painfully stilted gait. Her temperature was 102.8 degrees F. at that time. Sodium iodide and calcium borogluconate were again injected. There was no evidence of diarrhea during November, December, or January, but the cow continued to lack appetite and lose weight. By February 3, 1942, her weight had been reduced to 560 pounds in contrast to the 940 pounds that she weighed on July 1, 1941.

* Research Paper No. 730, Journal series, University of Arkansas. Published with the approval of the Director of the Arkansas Agricultural Experiment Station.

On February 3rd a detailed clinical examination was made. The cow's temperature was 101.6°F. Her breathing was very shallow and rapid. The heart rate was 80. A Tallquist hemoglobin reading was 90. No parasite ova were found in the feces, but some undigested grain was present. One noticeable feature was the peculiar way in which the animal kept her head raised high at all times, even when lying down. The cow had become so thin that her skin was firmly attached to the underlying structures. Palpation of the uterus per rectum did not reveal any abnormalities. The rectal examination was not prolonged but it soon produced bleeding of the mucosa.

During the next seventeen days the cow was kept under close observation. Attempts were made to stimulate the appetite by administering cobalt, yeast, rumen stimulants, and various feeds. On February 13th sodium iodide and calcium borogluconate were again injected intravenously. A severe hemorrhagic diarrhea developed soon after this treatment. It is interesting to note that the cow was observed to ruminate only twice during the entire period from February 3rd to February 20th.

Atrophy of the muscles of the shoulders and thighs was observed some time before the 3 yr-old Hereford cow No. 60 was killed. In a case of apparent congenital Johne's disease Dunkin (6) reported similar muscular atrophy in a 3½-yr.-old Jersey bull. Dunkin made no mention of any changes in the bull's arteries. It might be supposed that vascular calcification in Cow No. 60 was responsible for the muscular shrinkage.

On February 20th the cow's forelegs were swollen and decubitus ulcers were present above the coronary bands of the forefeet. There was also subcutaneous edema along the ventral surface of the body. The cow evidenced a desire to drink water, but she could swallow only a small amount at a time. The condition was judged to be incurable, and the animal was killed for post mortem examination.

Postmortem Findings

The carcass was extremely emaciated, and the muscles covering the shoulders and thighs were severely atrophied. Edema was present along the throat, brisket, abdominal wall, and in the lower portion of the legs. The fat, of which there was but a scanty amount, was yellow-orange, suggest-

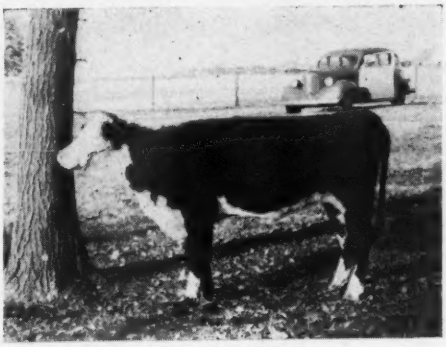

Fig. 2. Hereford Cow No. 60 on November 21, 1941, at the time when she received the second intravenous injection of sodium iodide and calcium borogluconate

Fig. 3. Hereford Cow No. 60, a few days before autopsy

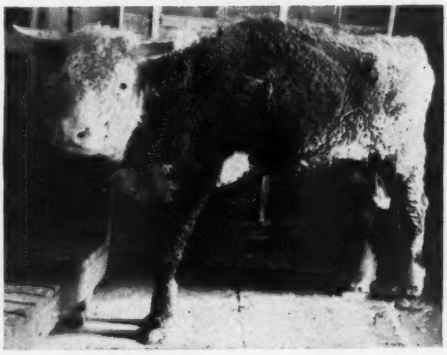

Fig. 4. Hereford Cow No. 60 on day of autopsy, February 20, 1942

ing mild jaundice. The tongue, pharynx, larynx, and trachea all appeared normal. The lungs were emphysematous, and interalveolar calcification extended around their periphery. The heart was slightly hypertro-

Fig. 5. Carcass of Hereford Cow No. 60, showing extreme emaciation and lack of subcutaneous fat

phic, and portions of the endocardium were calcified. The pulmonary artery and the aorta were hard and when palpated felt almost like a trachea. This condition was produced by the presence of rough calcified plaques over most of the inside arterial surfaces. As the arteries to the other organs were dissected, they were also found to be hardened. They could be easily traced because the blood remained in them, which it does not do in an animal with normal elastic vessels. The metacarpal arteries were nearly closed by the accumulation of precipitated calcium salts. The mesenteric, renal, splenic, and uterine arteries were all similarly involved.

The liver was moderately swollen, and of a rubbery consistency. Calcification was present in the diaphragm and spleen. Hemorrhagic infracts were numerous along the border of the spleen. The kidneys presented a lined appearance suggestive of beginning calcification. The uterus was somewhat hyperemic.

The mesenteric lymph nodes were slightly enlarged. There were darkened areas on them that were depressed from the normal contour of the node. The dark portions appeared to be made up of decomposition products of blood. The lighter parts of the nodes were more juicy in consistency than is normal.

The forestomachs appeared anemic. The serosa of the intestines contained many nodules that looked very much like the lesions caused by nodular worms. Cross sections showed them to be composed of material similar to that in the arterial plaques.

The mucosa of the duodenum and jejunum appeared normal, but changes typical of Johne's disease were found in the ileum, cecum, anterior colon, and rectum. The mucous membranes were in thick folds with darkened areas especially marked on the crests of the folds.

Fig. 6. Arterial and endocardial calcification in Hereford Cow No. 60

Distribution of Organisms

The typical lesions of Johne's disease have in general been considered to be confined entirely to the gastrointestinal tract and adjacent lymph nodes. In the case here described microscopic examinations of various tissues were made in an effort to determine the full extent of the invasion made by the Johne's bacilli. Acidfast organisms indistinguishable from *Mycobacterium paratuberculosis* were found in fecal smears, the mucosa of the rectum, colon, cecum, ileocecal valve, and the distal portion of the ileum, as well as in many of the mesenteric lymph nodes. It was in these areas that the gross changes usually associated with Johne's disease were found. Microscopic examination of the abomasum, duodenum, jejunum, heart, lungs, blood, uterus, bladder, aorta, kidney, and lymph nodes other than the mesenteric did not reveal any acidfast bacilli. These observations agree with those of most other investigators. Alexejeff-Goloff (7), however, reported that he saw typical paratuberculosis organisms in nearly all of the internal organs of four cows which he examined.

Discussion

In a case of this sort it is both interesting and important to know something of the history of the herd from which the animal under consideration came. The first accurate diagnosis of Johne's disease in this herd was recorded in 1933, although there are indications that the trouble was present for some time before that. Death losses have been very high at times, and abortions are still common despite the fact that the herd has been free from Bang's disease since 1939. Hereford cow No. 60, which was negative to two agglutination tests made after her abortion in September 1941, was a good example of this situation. In the years previous to 1939 all cows which aborted were slaughtered whether they were positive reactors or not.

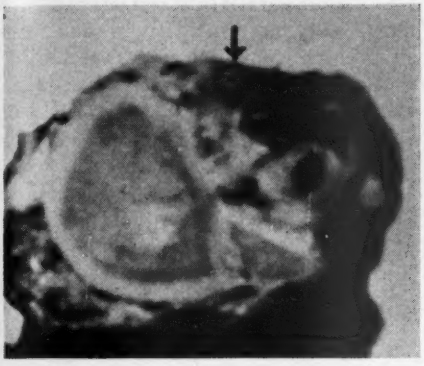

Fig. 7. Arrow points to cross-section of calcified artery in metacarpus of Hereford Cow No. 60

In many respects this herd has not been self-sustaining. Over a period of fifty years Brown Swiss, Guernsey, Holstein, Jersey, Aberdeen Angus, Hereford, and Shorthorn cattle have been kept on this farm. Chronic scours and emaciation developed in the animals, and it was not long before the Brown Swiss and Guernsey cattle died off entirely with symptoms of this sort. The other breeds are still being raised on the premises, but over half of them react positively to injections of intradermic johnin.

This case is of considerable interest not only as an isolated instance, but also as an illustration of some characteristics of Johne's disease. In connection with the individual animal, some mention should be made of the results of several successive intradermic johnin tests. Although similar tests have been made on the herd from which this cow was taken, Table I has been compiled to show only the reactions of Hereford cow No. 60 and of her dam, Hereford cow No. 58. It will be seen that both were positive reactors at most times.

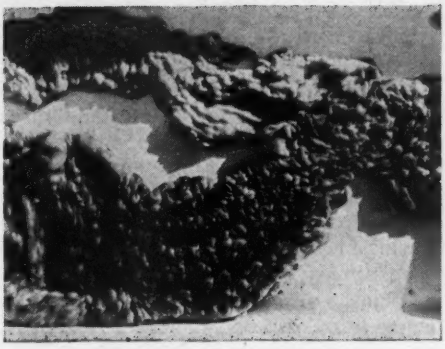

Fig. 8. Lesions of Johne's disease in the ileum, cecum, and colon of Hereford Cow No. 60

TABLE I.

Cow No.	Sept. 1940	Jan. 1941	May 1941	Nov. 1941*	Feb. 1942
58	3X	X	1mm. nodule	1mm. nodule	no test
60	X	P_2	P_1	P_1	N

* *Simultaneous tuberculin test: No.* 58—1mm. nodule: No. 60-N.

At the present time Hereford cow No. 58 appears normal and in excellent condition.

In spite of the fact that Johne's disease has been present for so long on the farm, there is no record of its having previously produced arteriosclerosis of the sort found in Hereford cow No. 60 in 1942. It is likely that thorough autopsies were not made until rather recently, so that the condition could have been missed. Neither is there any indication of magnesium deficiency in the rations in the past or at present. The animals have been well fed, with pasture, hay, and mineral supplements, as shown by the records kept for several years back. Since Johne's disease rather than magnesium deficiency is known to have existed in the herd, the obvious assumption is that Johne's disease was more directly connected with the arterial calcification.

It was disappointing to be unable to demonstrate acidfast organisms in smears from the calcified arteries. The bacilli may thus be condemned primarily only from their invasion of the digestive tract and lymph nodes, and apparently only secondarily for the changes in the vascular system.

According to Creech (8), arteriosclerosis is rare in American cattle. He draws no conclusions about the possible cause of the trouble when it does occur, and makes no mention at all of either Johne's disease or magnesium deficiency as important factors. He does present the records of the Bureau of Animal Industry, which show that only 60 cases of arteriosclerosis have been referred to the Pathological Division in a twenty-five year period. He also points out the Bureau's finding that these lesions are much more common in young cattle than in older ones.

Summary

A case of advanced arteriosclerosis in a three-year-old Hereford cow is described, and the possible relationships of Johne's disease and other factors as predisposing influences are discussed.

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There Can Be No Profit in a Diseased Animal

The preventable loss from animal disease in this country amounts to a staggering sum annually. No one knows even approximately its size. Disease is definitely the limiting factor in animal production and undoubtedly costs agriculture several times the amount of government subsidies it has received.

Twenty-five per cent of all the pigs farrowed are lost from other than accidental causes before they are a week old, and only about half the pigs farrowed reach marketable age. Because of this loss our hog raisers board free the year round five or six million sows. Hog cholera is a disease that can be rendered all but innocuous without difficulty, and perhaps it could be eradicated; yet it costs the swine industry 20 to 30 millions of dollars annually.

The loss in the incubation of eggs and in baby chicks is incalculable, and 30 to 70% of the hens that survive chick diseases are lost from disease during their first laying period. As a result, loss is more common than profit in the poultry industry.

An incapacitating, but preventable skeletal disease of horses is so widespread that comparatively few farms entirely escape it and farm mortgages multiply for the purchase of tractors.

The dairy industry feeds, houses, cares for and milks 24 million cows for a production that half that number should easily manage, and the principal reason for this is disease. If it could deduct the expense of maintaining 12 million cows from its cost, the dairy industry would be prosperous without lend-lease aid.

The category is unending—even among pet animals the situation is not improved. The 40,000 commercial breeders of dogs in this country, lose 135,000 puppies annually before they are two weeks of age and 50% of the remainder die before they are mature. Again, a staggering loss from disease that all but precludes profit in the industry.

★ ★ ★ ★

★ ★ ★ BUY WAR SAVINGS STAMPS AND BONDS

Veterinary Service of a Pack Train in Eritrea

The fact that veterinary officers of the American Army are to be in India, Africa and the Middle East and if not in all those places abroad are expected to be there soon, heightens the interest in this account of army veterinary service in Africa. It was written by Captain J. H. McGhee of the Royal Army Veterinary Corps and published in the *Journal of the Royal Army Veterinary Corps*, (Feb., 1942):

Two mule pack transport companies were ordered to move forward for work in connection with the attack on a very difficult position in the mountains, where the enemy was making a determined stand after having been pushed back from the plains of the Sudan and Eritrea. After arrival at the railhead a long march had to be undertaken to reach the forward area. This was done by forced marches, taking twelve days. The longest day's march was thirty-five miles and took fourteen hours. The route lay through sub-tropical bush country quite thickly populated with game: ariel, gazelle, sand-grouse, etc. A number of these were shot for the pot and were much appreciated as a supplement to the hard rations which were carried. It should be mentioned that on this march the companies carried all their own baggage, rations and forage. In addition, one company was transport for a pack battery. All the mules commenced the march under full loads.

The animals stood the march well; there were a few cases of exhaustion and one company was forced to halt for a day's rest. Casualties, however, were few and were confined chiefly to saddle-galls, some of which were severe. It should be mentioned that the personnel were Cypriots and the standard of horse (or mule) mastership and line-of-march discipline was not very good, although the Cypriots are past masters in the art of handling mules and can handle a mule which British personnel would be unable to approach. Sudanese ponies were provided for officers and N.C.O.s. These are small, ungainly creatures, but carry astonishing weights, have remarkable stamina and can go for long periods without water.

On arrival at the forward area the companies went into action immediately. The work consisted of taking loads up precipitous hills, some of which were 6,000 feet above sea level, the climb to the positions being anything up to about 2,000 feet. Narrow, winding tracks had been prepared by engineer troops if none already existed. Mules did two or three journeys a day, each journey taking from two to three hours up the hills and rather less down. In some cases the tracks came under enemy shell fire and often the journeys were made during the night. The mule lines of one company were shelled out of several positions until a fairly safe place was found for them. This was in a valley, and the noise of explosions reverberating round the hills was at times deafening, especially when our own medium battery, which was in the valley, also opened fire. The other company were on a railway line several miles away. Their position also came in for a fair amount of shelling and bombing, artillery duels also taking place over them. An enemy pack battery which operated in this sector was a great nuisance.

The loads taken up the hills were very varied and it was found that practically any article could be carried on the pack saddle (Indian type). Amongst the loads were rations, water, ammunition (shells and S.A.), mortars and machine guns. On some occasions live sheep were carried for the Indians.

It should be mentioned that, although the temperature on the hills during the day was in the region of 120° F., at night it was bitterly cold. Many of our clinical thermometers were broken by the heat, and it was difficult to take temperatures during the day. If one was not quick in reading the thermometer each case recorded a high degree of fever! Temperatures were normally taken in the early morning or in the evening.

One Veterinary Officer was in charge of both companies, and each company had an R.A.V.C. Sergeant and two R.A.V.C. Privates.

It was not possible to evacuate animals to a base veterinary hospital, the nearest one being about 700 miles away. Therefore, a small hospital was established at the H.Q. camp of one of the companies; sick and injured animals from both companies being evacuated there. This hospital came to care for about a hundred such animals. Captured animals were also collected there, most of them requiring veterinary attention, being badly galled and in a shockingly debilitated condition. At the end of the action there were about two hundred of them, mostly mules but some ponies and two camels, the last-named being rather a problem to deal with until someone was found who knew their ways and habits.

The Veterinary Officer's routine was to inspect the sick in the hospital and perform such operations as were necessary before breakfast. Afterwards the advanced mule lines were visited, which, as already noted, were widely separated, and this took up the greater part of the day. Inspection of the sick at the advanced lines was made to decide which animals to rest, send to duty or evacuate. Evacuation was carried out by motor transport for animals which were unable to walk, otherwise they were marched back, the conducting party returning with animals discharged from hospital as replacements. It had to be borne in mind that it was absolutely necessary that every mule which could work should do so, owing to the vital necessity of getting supplies up to the men who were fighting in the hills. There was therefore a tendency to allow animals with minor injuries, such as saddle-galls, to go to work when they really should have been rested, and as a result some of them became major injuries.

A notable fact was the low number of deaths among the mules—only a few were killed, although they came in for a fair amount of shelling and bombing. A large number of gunshot wounds also occurred, some of them very serious.

In one case with an abdominal wound there was a protrusion of a small piece of the intestine: this was returned under not very aseptic conditions and the wound sutured; the animal made an uneventful recovery. Another mule had a shell burst under its belly and about thirty pieces of shrapnel had to be removed. The animal suffered from a certain amount of shock, but made a rapid recovery. The rapidity of healing of the wounds of the mules was remarkable, in contrast to those of the men, which healed so slowly and tended to develop into a nasty sloughing ulcer known as "desert sores."

A lot of trouble was caused by birds of very gaudy color which pecked the wounds. At first it was thought they would only peck away the necrotic tissue and thus assist us in our work, but it was quickly seen that they were not so obliging and it was very annoying to find that a small wound had suddenly become a large one as a result of the attention of these creatures. Various devices had to be employed to keep them off; Stockholm tar was found to be most effective. It was surprising how the mules would stand and allow these destructive birds to peck away at their wounds, but on the other hand would kick like fury when approached by the dressers, whose attentions were much more merciful.

The forage received was generally of poor quality and consisted chiefly of millet, Indian hay and tibben, with some bran (which was actually quite good) and occasionally dries. It is a noteworthy tribute to the mule that after twelve days of forced marching and a fortnight's hard work in action their condition was, on the whole, good. They did, of course, lose some condition, some more than others, but there was not a single case of debility.

Owing to the stony nature of the ground it was found necessary to shoe the animals all round. When owing to shortage of shoes it was not possible to do so, a number of animals became footsore and some had to be rested. It was feared that the units might be immobilized and urgent demands for shoes were sent, the shoes being received very quickly.

There was a good supply of veterinary stores, fresh supplies being received during the action. Also some veterinary stores were captured from the Italians and came in very useful. The impression was gained that the enemy used too many medicines to be good veterinarians.

At the conclusion of the campaign one company remained in Eritrea to perform salvage work. This work consisted of taking the stores down the hills which, ironically enough, they had previously worked so hard to take up. The other company returned to Egypt via the Nile Valley route, a long march being necessary to reach the railhead. On this march the transport problem was much relieved by the acquisition of some captured motor trucks so that the mules had only light loads to carry. Two water trucks were attached for the supply of water to men and mules. Native water-holes were few and far between and could not be relied upon. Mules were watered twice daily. The heat during the day was most intense, any metal—for instance, knives and forks or the steering wheel of a car—being almost too hot to touch. It was therefore customary to march at night, and on this occasion a brilliant moon rendered it almost as light as day. The night life in these parts was considerable, for frequently natives were met trudging through the night, usually at a sort of half-trot. Here and there little bands of them lay round a fire, one of their number seemed to be a picquet to keep the fire going in order to keep away the various wild animals which roamed the countryside at night. There were plenty of hyena about, and it was thought that there might be lions, too. Loud growlings and roarings used to be heard frequently and often padmarks of obviously large carnivora were seen. Of course, it is the habit of all natives to regard any animal of any size which moves at night as a lion, especially if that animal also "growls." On one occasion there was a great deal of confusion and excitement in the camp when shouts of "lion, lion," went

up and a number of shots were fired. On investigation it was found that a mule had broken loose and wandered through the lines.

During this march the veterinary personnel had a lot of work to do, as there were a number of cases to be dressed, and it was their unfortunate lot to have to work at the end of a march when most of the troops were able to rest.

Stockholm tar was found to be the most suitable dressing for wounds, and if applied on a thin layer of cotton-wool it remained in position. It was easily obtained from any bazaar in that country, where it was known as *"gutran."*

One incident of veterinary importance occurred on this march, in the shape of an outbreak of what was thought to be African horse sickness. Other units had experienced it and it was called by the natives, who were questioned about it, *"nigma"*; but it seems that any serious disease of animals in these parts is known as *nigma*. At all events, it was known to be a serious disease. One unit had seventeen dead and fifty sick in three days. The appearance of such a plague caused some misgivings, because it was feared that the unit might be immobilized for some weeks in this waterless, subtropical bush. The C.O. was informed of the occurrence of this disease, one animal having been reported sick with it at 7 p.m. and dead in two hours. He was advised to move to the nearest village, about fifteen miles away, where there was water, and halt the unit to await developments. This was done, but in the meantime another death occurred. A signal was sent to G.H.Q. informing them of this, and also to the A.D.V.S. It happened, however, that the A.D.V.S. was in the area and would be passing along the one and only road A notice was put out on the road giving the name of the unit with an arrow pointing towards the camp, and saying "A.D.V.S. Wanted." Two days later he arrived. By this time another death had occurred and several suspects and incontacts were isolated.

It did seem that the attack was not as severe as had been experienced by other units, and as it was possible that the unit was required in another theatre of war the A.D.V.S. gave authority for the unit to move on. Only one other death occurred, so it turned out to be a very mild outbreak, perhaps due to the fact that the unit was moving out of the zone of this disease. The nature of the disease was not definitely established. The unit had been inoculated with a vaccine containing several strains of the virus of African horse sickness. The typical edema of the lungs and frothing from the nose did not occur. The symptoms were swelling of the supra-orbital fossa and inter-maxillary space, blue discoloration of the gums and tongue, in one case the passage of blood-stained urine, a temperature of about 103° F., and the usual signs of fever, with death usually in a few hours. It may have been a form of the disease peculiar to that country. The Sudan Veterinary Service had had no experience with it, and if the Italians had there was no record of their having investigated it.

The march was completed without any further incidents, and it was good to have a few days' rest at the railhead awaiting the train, which went as far as Wadi Halfa. From there the journey was continued by river steamer (the animals going in barges lashed to the side of the steamer). Three days on the steamer was indeed the pleasantest part of the journey. The journey into Lower Egypt was completed by train. On arrival there we were eager for the latest news. No one had seen a paper for many weeks; occasionally a news bulletin outside some Town Major's office was seen or someone was met who had heard a news broadcast a day or two before; news two days old was regarded as very recent.

Thus ended a journey of tremendous interest full of never-to-be-forgotten experiences and in which some part had been played in helping to defeat the enemy. But how nice to be able to enjoy some of the comforts of life in Egypt!

One final word: praise for the mule. As is known, most animals lose condition on a long rail journey, but the mules had so improved that when the D.D.V.S., M.E., inspected the unit on the day following their arrival in Egypt, he gave a very good report on the condition of the animals and even remarked upon the fatness of some of them.

Why Must and How Can Veterinary Service be Extended?

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WHEN I was in College studying veterinary medicine, about twenty-five years ago, most of our attention was directed to the horse and its ailments. Some attention was given to diseases of cattle, dogs, swine and sheep. Poultry and wildlife were hardly mentioned. It so happened that my highly esteemed professor, Dr. L. Van Es, and some of his associates were then engaged in perfecting a tuberculin test for chickens. As his student assistant I was given the opportunity to help in making autopsies and microscopic examinations for tubercle bacilli, when work with the experimental birds had progressed to a certain point. I also was fortunate to be able to observe the administration and the results of the tuberculin test. When I was graduated this constituted my college preparation for the work which was soon to demand a good share of my time, namely poultry pathology.

Scope of Veterinary Science Enlarged

Since then marked changes have been made in the curricula of our veterinary colleges. Instruction now includes diseases of all domestic animals and birds and also those of wild-life. Furthermore, investigations have been in progress constantly in the various agricultural experiment stations and many other research institutions, all aiming at solutions of a multitude of problems connected with diseases of beasts and birds.

Gratifying Progress Made in Animal Disease Control

In the field of prevention and eradication of animal diseases, many noteworthy achievements have been made. The veterinary profession may well be proud of the results accomplished in the work with Texas fever, tuberculosis, brucellosis, rinderpest, anthrax, blackleg, hog cholera, canine distemper, glanders, dourine, foot-and-mouth disease, hookworm infestation, fowl pox, laryngotracheitis, pullorum disease and others.

The service rendered in the prevention, control and eradication of animal disease is of great importance to human health. Few of our citizens have any realization of the protection they now enjoy as a result of food inspection and other veterinary work.

In addition to the numerous services rendered in civilian life, the veterinarian has also played an important role in military affairs. Thus, we find the veterinarian in private practice dealing with the diseases of many species. We find him in federal, state, municipal, military, educational and research positions, practicing, inspecting, teaching, investigating and extending his knowledge to those he aims to serve.

Further Extension of Veterinary Service Needed

In spite of the great development of veterinary medicine during the present century there is still urgent need of further extension of our veterinary service. Many large but sparsely populated areas do not have ready access to the services of a vet-

erinarian, especially one who has been trained in a modern school. The reason for this obviously is the fact that private practice in such areas does not offer a sufficient income for a respectable living and no provision has been made to make up for this deficiency.

Such areas are breeding places for some very undesirable conditions. Quackery is bound to flourish in such places. Another and much more serious thing, that must be thought of in this connection, is the possibility of dangerous contagious diseases breaking out in such unprotected areas and remaining unrecognized long enough to gain serious momentum. It is not difficult to imagine what could happen should foot-and-mouth disease be brought into an area where its true nature might escape recognition for even a month. Such possibilities are not too remote in times of total war.

Furthermore, our modern social and economic order demands that the people living in such areas should have as many as possible of the privileges which are possessed by those who live in the more favored communities.

The Growing List of Diseases Communicable from Animals to Man

Many serious communicable diseases of animals are known to affect man. Bubonic plague, which has killed millions of human beings in the past, is primarily a disease of animals such as rats, squirrels and ground moles. Transmission from animal to animal and from animal to man, etc., is brought about by fleas—rat fleas, squirrel fleas, dog fleas and avian fleas, and, in the pneumonic form, also by droplet infection. This disease is endemic in ground squirrels in California. Infected rats have also been found in California, Texas and Louisiana. In all these states occasional human cases have occurred. There may be little danger from this disease in peace-time, but there are unpleasant possibilities to be considered in times of war. Other diseases of similar nature are spotted fever, typhus fever and tularemia. Then there is bovine tuberculosis, brucellosis and more recently it has been found that man is susceptible to the same virus that causes encephalomyelitis in horses and that horses are susceptible to the virus of St. Louis encephalitis in man. The virus of infectious encephalomyelitis has been found in pheasants, pigeons and a prairie chicken. Psittacosis, or parrot fever, has been known for a score of years to be communicable to man. Recently it was found in South Africa that pigeons harbor the virus of this disease. Food poisoning and infections caused by organisms of the paratyphoid group, contracted from animal food products, have long been recognized. Within the last year five members of one family in Sweden contracted *Salmonella typhimurium* infection from chickens. We could go on and name a large number of animal diseases communicable to man, stressing the importance of an adequate veterinary service in all communities where animals are kept.

To add emphasis to the need of veterinary service in the more sparsely populated areas may I call attention to the report of Doctor Leake of the U. S. Public Health service on the epidemic of equine encephalomyelitis which occurred in the northwest in 1941. According to this report the incidence and death rates were as follows:

North Dakota	1000 cases with 96 deaths
Minnesota	815 cases with low death rate
Manitoba	434 cases with 42 deaths
Nebraska	250 cases with 40 deaths
South Dakota	180 cases with 11 deaths
Montana	64 cases with 6 deaths

The incidence in Saskatchewan was similar to that in Manitoba.

Obviously the greatest means of protection to humans lies in the prompt recognition and control of such diseases in their animal hosts.

Some of the leaders in the field of human medicine recognize the urgent need of cooperation between men in the field of human and veterinary medicine for the purpose of protecting the public against diseases of animals communicable to man. This is one reason why Harvard University has opened its School of Public Health to veterinarians. It is hoped that more schools of public health will follow the example of Harvard. The veterinarian has long been aware of his potential value in the field of public health, but some medical authorities have been a little slow in coming to this realization.

The Need of Veterinary Service for Poultrymen

The poultry industry could well benefit by more attention from well-trained veterinarians and could thereby extricate itself from the greatest drain on its resources, the quackery of manufacturers and vendors of useless and even harmful "remedies."

How Can Our Veterinary Service Be Extended?

The foregoing material has been cited in an effort to show the need of an enlarged or extended veterinary service. An attempt will now be made to suggest ways in which this may be accomplished.

First, it must be said that, in addition to a need for extension of veterinary service, there is also a need for improvement in its quality. Considerable improvement in the quality of veterinary service has already been accomplished. The lengthened veterinary course, postgraduate short courses, extension courses for veterinarians, veterinary conferences of several kinds are all steps in that direction. All this means that the cost of veterinary education has increased considerably, and we must not forget that there must be reasonable prospects of employment and adequate compensation after graduation if we hope to attract good men to the profession. It is hardly to be expected that men will enter the field of veterinary medicine for no other reason than love for the work.

In the second place, an up-to-date veterinary service should be designed to serve the public at large as well as the individual livestock owner, because by caring for individual herds or flocks, protection is provided for other herds and flocks, yes, even for the human population, which is susceptible to many of the maladies of animals. Therefore, all communities, small or large, densely or sparsely populated, should have ready access to veterinary service. To provide such service is not too difficult a problem. It is one that has been worked out in various ways in different parts of the world.

Semi-Socialized Veterinary Service in Norway

As an example of how an efficient veterinary service has been provided for an entire country, a brief description will be given of the veterinary affairs of Norway, where I served for 18 months as district veterinarian. Norway is a mountainous country and different communities vary greatly as to livestock population and facilities for travel. Some communities are prosperous, densely populated and offer abundant opportunities for private veterinary practice. On the other hand, there are locations where mountains and fjords make for great distances between communities and farms; where the livestock population is small, and consequently the opportunities for private practice are relatively poor. Under such conditions it is evident that the veterinary needs of Norway could not be solved by private initiative alone. In order to provide a satisfactory veterinary service for the whole nation, the country has been divided into veterinary districts, classified as to the opportunities for private practice and related conditions. A class-one district is one in which conditions indicate a good private practice could be established, thus providing the opportunity for a substantial income from that source. A class-two district is one in which the outlook for private practice is not so good as in a class-one district, and a class-three district is one in which the income from private practice is apt to be low. In order to provide adequate veterinary service for the entire country, and, at the same time, provide fairly equal financial returns for work rendered, a system of salaries has been fixed for the various classes of districts, the salary in class-one districts being the lowest and in class-three districts the highest. Thus, the salaries plus the income from private practice will, on the whole, offer the veterinarians a very comfortable living. In some of the better districts there may be veterinarians also who are engaged entirely in private practice. The money for salaries is provided by the state, county and local governments. For work with the malignant contagious diseases the veterinarian gets a per diem fee plus traveling expenses, and the work is done without charge to the owner. The rest of his work is done as in private practice. Some veterinarians do a good deal of food inspection, and all are expected to do so

when occasion requires. Livestock sanitary police duties are incumbent on all district veterinarians. It follows naturally that, due to the fairly substantial salaries paid the veterinarians serving the poorer districts, they can afford to render service to the less fortunately situated livestock owners for smaller fees than they would have to charge were they entirely dependent upon such fees for their livelihood. Consequently they can also render reasonable service for animals of rather small individual value, such as sheep, hogs and poultry.

Every district or state veterinarian contributes to the State Pension Fund. In that way he protects to a certain extent, himself and his wife for the future.

Livestock Insurance

Livestock insurance was held by most farmers in Norway. Some of them insured their animals with regular insurance companies. In some localities the farmers had their own insurance organizations, varying from those in which insurance premiums were charged to some loosely organized mutual benefit groups in which farmers were banded together by an agreement to help one another financially, when misfortune should befall one of their members. Each member of such an organization simply agrees to contribute a certain share based on his livestock holdings. All members of these organizations and those who insured their animals with regular insurance companies were obliged to employ a licensed veterinarian whenever needed, or no claims for compensation would be recognized.

What Can We Do in the U. S. A.

There are several possible arrangements by which veterinary service can be provided for more people. The Norwegian system could be employed in many localities, with modifications where necessary. On the Mendocino coast of California a veterinarian has been employed as State Meat Inspector. His work, as such, requires only three days per week, the rest being available for practice. Other, more or less similar combinations of work, can easily be arranged, thereby supplying communities, where private practice alone will not yield sufficient income to attract good men, with modern veterinary service. Surely such service will be preferable to the quackery that usually goes on in areas where there is no graduate veterinarian within reasonable reach.

More Veterinarians Must Take Active Interest in Poultry

Anyone, who is at all familiar with the tremendous growth of our poultry industry and the deplorable lack of interest in poultry disease on the part of a large number of our successful veterinary practitioners, will agree that something must be done to remedy this situation. By various arrangements poultry practice can be made to fit in with other veterinary work provided the veterinarian does not try to act as a nurse. Due to the small value of individual birds, he cannot afford to treat masses of fowls individually. He must work on the basis of flocks, serving as a diagnostician and adviser as to what to do. He may also have to supervise blood testing and vaccinating, when live virus vaccines are used, but the more common measures such as administering worm remedies, etc., he can well leave to the owner. By close contact with poultrymen in his area he should be able to eliminate the practice of "giving something" when "something" seems to be wrong with poultry. For his diagnostic and advisory work he is entitled to a fee based on the value of the flock and not on individual birds.

In the more important poultry centers veterinarians sometimes work with poultrymen on a contract basis. The owner is entitled to a certain number of calls per year for the purpose of aiding in keeping the flock well.

These are just a few suggestions as to how veterinary service may be extended to all husbandmen, be they cattlemen, sheepmen, poultrymen or any other owners of animals. There is no better way to defeat quacks than to make them try to compete with honest, well trained veterinarians.

* * * *

The more fundamental and extensive training required today in our leading veterinary colleges, especially in the field of hygiene, prepares the graduate in veterinary medicine for cooperation with public health officials.

Autobiography of a Veterinary Practitioner

By E. T. BAKER, Moscow, Idaho

VIII

I Become a Professor

SPENDING a few years as a college teacher gives one an experience he never forgets. He sees a new bunch of young men enter each fall, and a group of seniors leave. Out of the latter, he regrets to see several pass out into the world, for he has learned to have a genuine affection for them. Most of the students, however, are just human beings, and come and go like people on State Street, in Chicago.

I was not a dignified personage by any means, and preferred telling funny stories or relating my experiences in actual practice, to boring the students to death with long-winded lectures. I think college professors take themselves too seriously, as a rule, and try to inject too much knowledge at one sitting into the youthful mind. One of my old students visited me just last winter, and said about all he remembered from his college course was a few of my foolish stories.

In my class work, I always insisted on regular attendance, and believed in keeping the students awake. I gave them one-third for attendance; one-third for quizzes and one-third for the final examination. I never gave a quiz on a Monday, especially following a big football game, and would often omit a Friday afternoon class, if a number of the students wanted to go to some other city to attend an athletic event. In return for these favors, most of the boys studied very well, more than 90% learning the name of the course.

I was a great believer in frequent quizzes. My method was to sit down beside a boy and ask him a number of questions. In this way, no wireless assistance could filter through from the rear row. After several attempts at bluffing, the students found out all I wanted of them was a working knowledge of the course; if they forgot some minor detail, I overlooked that. In other words, I wanted them to be able to talk intelligently about the course. My final examinations were not difficult, for I knew the approximate grade of each student before it was ever given. I would write five or ten questions on the blackboard and return to my office. One of the seniors told me afterward there was less "ponying" than in other classes, because I trusted them, and treated them as equals.

By using tact and judgment, one can handle a group of students far better than trying to "prussianize" them with hard and strict rules. If the student feels the "prof" is a good scout, and the great majority of the class like him, he is not going to gain the reputation of "mooching." The average boy or girl is a pretty "good egg" when handled right, and given a square deal. However, when one would try to "put something over on me," I never forgot it, and treated him as a pariah the rest of the semester.

I would classify myself, therefore, as a very indifferent teacher, lacking dignity, and never feeling that a college diploma entitled me to think I was better than anyone else. Having learned a trade before going to college, my outlook on life was different than it would have been if I had never been in the workaday world. While

teaching was interesting, I cared little for it, and after the first year it became quite monotonous.

As I look over our field, I think the personnel of our colleges is of more vital importance than large buildings or equipment.

The author carried out the prediction of the superintendent and got well—then he married one of her nurses. Above is pictured his home

It is unfortunate that every college professor has not had several years in practice, so that he can visualize the problems his students will meet in their work. If he is practical, ethical, magnetic, human, and possessed of a sense of humor, his graduates will usually do pretty well out in the cold, cold world.

Part of my work consisted of being in charge of the small animal clinic. We had the worst outbreak of canine distemper that winter that I have ever seen. It might be called a combination of distemper, encephalitis and Stuttgart plague. Nearly all the survivors died later with chorea. This experience taught me to have a wholesome respect for canine distemper, and never to give a very optimistic prognosis.

During my second year at Washington State, I contracted typhoid fever and spent nine weeks in the hospital, dropping in weight from 175 to 130 pounds. One night, when the crisis came, the superintendent of the hospital, who was a sincere Christian woman, came into my room with her Bible. It was feared I might be shaking hands with St. Peter at the golden gates before morning, and she wanted to do all she could for the young man three thousand miles away from his relatives. However, when she had finished reading the 14th chapter of St. John, which is really a beautiful and comforting piece of literature, I opened one eye and asked her who had won that day—the New York Giants or the Pittsburgh Pirates. Closing her Bible, she walked out of my room, telling my special nurse, "That young man in No. 16 will recover." I carried out her prediction, and also married one of her nurses.

My two years at Washington State were coming to a close. An opening at the University of Idaho was available, and I asked Doctor Nelson what he thought of it. He had treated me as a son, and I had great confidence in his judgment. He pointed out the advantages and drawbacks, which I found later to be absolutely true. When I decided to take the job, he gave me six weeks vacation with full pay, and I had received my salary while sick, as well as $270 from an insurance company on a sickness and accident policy.

As I look back upon these two years, I cannot see how a young graduate could have been more fortunate than I in the training that I received. Not only had I traveled in every county of the state, but I

had met nearly every practitioner, and had learned much from them. It was an intensive and instructive post-graduate course, with all expenses paid and a small salary besides.

I have always admired craftsmanship in every art, trade or profession. It is a pleasure to watch an expert brickmason fashion a beautiful structure with his hands and brain. The surgeon who bends over a human body, deftly removes pathological tissues, and watches the body slowly return to health, is a master of his art. The stock breeder who raises beautiful animals, or the orchardist who produces prize winning fruit, both have my unbounded admiration. It is the art of being able to do the thing at hand as well or better than others.

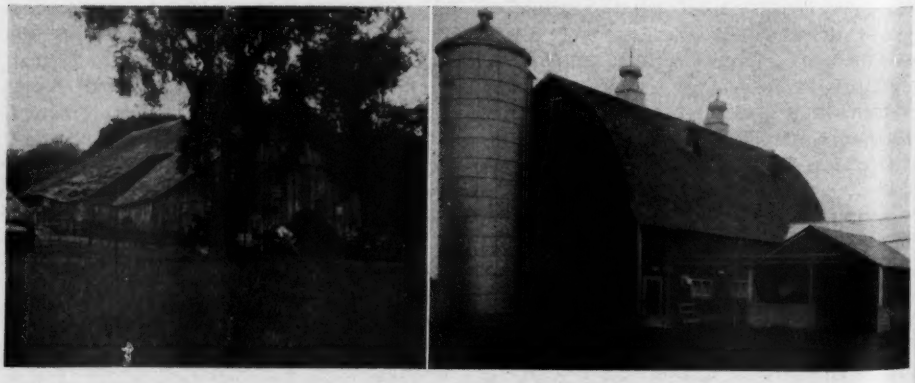
The machine age has largely done away with this feeling in many lines. Thirty years ago, a leather worker, laboriously and skilfully fashioning a set of harness, knew every inch of leather and buckle in it. He was proud of his handiwork, and sold it with the utmost confidence in its durability. Today, one man cuts the leather; another stitches it together; others affix buckles and finish it. No one is responsible. If it is good, all right; if it falls to pieces, the retailer who sold it does the explaining. (We use this as an example only.)

I remember once going out with an old practitioner and noting his ease in handling the patient and his diplomacy with the worried owner. The patient was a very sick, excitable and vicious mare, but without any struggling, he administered several capsules between "yumps" and also gave a hypodermic injection. He stood behind a post and catheterized her, and also gave a small

Doctor Cozier of Bellingham showed me how to handle a cow with ease and dexterity

rectal injection. He took no chances, but worked quietly, efficiently and intelligently.

Another time I drove out with Doctor Wood, of Walla Walla, to see a case of equine dystocia. Doctor Wood was very tall, with long arms, and perhaps had more equine practice in a month than most of us have in several years nowadays. At that time every ranch had from 20 to 60 horses and mules, and there was plenty to do. Doctor Wood showed me how important the position of the patient was, what equipment was necessary, and what complications might follow. Then he demonstrated what can be



Over on the coast dairying is a leading industry, and there is much cattle practice

done with a pair of capable arms and hands. That one trip was worth a semester of theory.

Over on the Coast, where dairying is a leading industry, I went out on a call with Doctor Cozier of Bellingham. He showed me how to handle a cow with ease and dexterity, and I use the same system today.

The city practitioners were just beginning to take an interest in small animals and to build hospitals. I learned much from some of these men, becoming adept in handling pets, and that knowledge too has been of great value in my general practice ever since.

Best of all, I gained an insight into the psychology of practice, and how to handle various types of clients. I found there were really no set rules in fees, although in a general way, most of the men tried to conform to certain fundamental prices, such as two or three dollars for a city call, and a dollar a mile, one way, out in the country, for ordinary calls. As one prosperous practitioner explained it: "When a poor guy loses his animal through no fault of anyone, but just hard luck, I shave his fee accordingly. Then, when some old tightwad has a sick one, and never calls me except as a last resort, I even things up, and that keeps me going." As he had lived in one location for over 25 years, and was fairly well-to-do, his advice was worth something.

Another thing, Doctor Nelson had always impressed upon me the importance of making friends wherever I worked. He was very indulgent in this regard, and would rather I spent a week on one job, gaining the good will of the community, than to rush in and out like an army of occupation. I would visit with people, and, if a picnic was going to be held, if invited, would take time off to attend. I cannot help but note the change that has come over this phase of life the past 20 years. When an area brucellosis test was made in our county last year, nearly a dozen young federal veterinarians rushed hither and thither as though driven to death. If a rancher did not have his cattle up at the appointed hour, they gave him a "cussing" and drove on. They grasped poor little Jerseys with bull nosers until the blood gushed out of the victim's nostrils, and some of the dairymen had trouble in milking their cows for nearly a week, they were so scared. None of these veterinarians had the courtesy to visit any of the practitioners in the county, and they made no friends in our community. Now, I had tested some 15,000 cattle for these ranchers, using a rope halter, and doing the work when it

City practitioners were becoming interested in small animals and were building hospitals

was most suitable for them. They were eager for the test. Only three of over 1,600 farmers refused to have their cattle tested, and this was due to religious scruples. This is not said in a spirit of boasting, but it is gratifying to recall that our county was the first one to be accredited in the state of Idaho.

Now, I am not criticizing these young men, for they are victims of a system that keeps them on the run to test their weekly or monthly quota. Disregarding the human element, the cry of the hour seems to be for speed and yet more speed. If one tests 30 cattle today, he is expected to keep that up, whether the next bunch are wild ones that have to be restrained by lassooing and snubbing up to a post, or docile animals in a modern dairy barn. Each state is expected to test so many head a month, and if the inspector-in-charge falls below this, a new inspector-in-charge appears. It reminds me of how Andrew Carnegie built up his vast fortune of some five hundred million dollars. He named his various blast furnaces after women, such as the Lucy furnace, the Mary furnace, and so on. If, for example, the men at Lucy furnace turned out 30,000 tons of steel this week, and the Mary furnace only

accounted for 25,000 tons, the manager of the latter would receive a sharp letter of rebuke from Andy. The next week, when Mary furnace came through with 35,000 tons, the man in charge of the Lucy outfit was chided for falling behind. It made no difference how many men were carried out

In testing 15,000 cows for brucellosis I used a rope halter—not such a contrivance as this

of the mills in a dying condition from dehydration and overwork; the tonnage must go up and up. Perhaps, this is one reason why I never see a Carnegie library but I think of the good American blood spilled in making that fortune. Today, a manufacturer of a popular make of automobile has developed the "speed-up" system until it is a marvel of mechanical ingenuity. The fact that human bodies and minds wither and lapse into total collapse seems to make little difference to this manufacturer. One of these days he will ride at the head of a parade and some minister will deliver a fulsome eulogy, and the world will go on.

The modern wave of haste can even be seen in the modern physician's office. You walk into an up-to-date waiting room, and a brisk young lady in white begins writing your life history. She asks you how old you are; how long have you imagined you have been sick; and where you want your body sent in case you do not come out from under. She wants to know how much of a deposit you can make, and who are your nearest relatives. Even if you protest you only want to see the doctor about a bowling match, she continues asking questions, and tells you to step into the next room where a urinalysis and blood count will be made. If you hesitate, she looks at you severely, and tells you the operation is set for ten o'clock the next morning, and to bring along a toothbrush. Contrast this with the leisurely system that prevailed some 20 years ago. You entered an old, home-like looking office, which contained a desk, chair, book case and some surgical instruments scattered around over the table. "Old Doc" mused in the office chair, thinking over the frailties of human nature. You sat down, and he asked you how the spring crops were looking out your way, and if that spotted heifer made a good milk cow. Then you discussed baseball, hunting, fishing, and, finally, as an afterthought, "Doc" would ask you what was on your chest. You would relate your symptoms, while Doc grunted assent, and then he would take a look at your tongue. Next, he would go over to his medicine chest and count out a couple dozen pink placebo tablets, and tell you to cut out staying up all night and get some rest.

"Take one of these tablets in a little water three times a day, and don't eat buckwheat cakes and sausage more than two times a day," he would say, and then add: "If you don't feel better in a week or two, drop in again." Sure enough, you would feel much better, and, about a year later when Doc would next see you, he would look surprised. "Well, I see you are still living. Quit your hellin' around all night, and you'll live plenty long enough," he would chuckle.

I hate to admit it, but I still have my tonsils and appendix, and do not even wear glasses. When others proudly speak of their operations, I hang my head in shame, for I have no scars to show, and, so far, have never been under the ether.

Yesterday, I was driving from a call, and was going around 50 miles an hour, which is plenty fast for anyone. Several young people passed my car as if it were standing still. They were going into town to spend the rest of the day loafing in one of the pool halls. They are typical of the times. Life moves on faster than it did in the days of only a few years ago.

(To be continued)

Placental Toxemia in Cows

Exact diagnosis of the various digestive disturbances of cattle which occur following parturition is often difficult. One condition which often is misleading and which may show a variety of symptoms is due to ingestion of the fetal membranes.

It is generally believed that the cow devours these membranes from an instinct which has survived domestication. In olden times the membranes were eaten by the parturient cow to detract the attention of predatory animals from the near-by hiding place of the calf. However, nutritional deficiencies also may be involved. "Devouring of their young and fetal membranes by sows is usually a sign of a deficiency of alkaline salts such as readily arises during pregnancy and at the commencement of lactation as the result of a diet poor in calcium and rich in phosphorus."*

This cow does not devour fetal membranes; she is content to munch on discarded paper

It is a common practice in dairies to dispose of the decidua to prevent the cow from eating them which among range cows is commonly done, in most cases with few or no ill effects. Occasionally an animal develops a serious, sometimes fatal, toxemia. Probably predisposing factors or resistance of the animal determine, to a great extent, the severity of the symptoms. A cow with an atonic rumen is more apt to develop a toxemia than one with a normal digestive tract.

An example of this condition is illustrated by a cow which had calved, giving birth to an abnormally large calf. The owner saw the cow eating the fetal membranes, but paid no attention to it. She continued normal for two days, then refused to eat. When presented to the clinic at Kansas State College she was in a markedly weakened condition; temperature 101.4°F., pulse 120 and respirations about 20. The conjunctivae were congested. No abnormal heart sounds could be heard. Rumination was suspended and no movements of the rumen could be detected. The diagnosis was toxemia, possibly due to the ingestion of the fetal membranes and the atony of the rumen. One gallon of carron oil, 120 grains of tartar emetic, and one ounce of U. S. tonic were given through a stomach tube, and 500cc of 25% dextrose solution and an equal quantity of 20% solution of calcium gluconate, were given intravenously.

The next day the animal was much weaker, unable to get up and the pulse was still abnormally fast. Rumenotomy was performed and shreds of the putrid placenta, from six inches to two feet in length were found all through the ingesta. These, together with about two-thirds of the rumen contents were removed. A search of the reticulum disclosed no foreign bodies.

Supplementary treatment with calcium gluconate and dextrose was given for the next five days. The patient was discharged from the clinic after one week apparently recovered.

A rumenotomy is the only logical way of treating such a condition. In this case the operation should have been performed the day the cow was brought to the clinic. A differential diagnosis between this and traumatic gastritis is difficult, but since rumentomy is the proper treatment for the latter ailment also, differentiation is not vital.

FREDERIC B. WALKER

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*Hutyra, Marek and Manninger, 4th English Edition, 1938, Vol. III, p. 239.

Pyelonephritis in a Cow

November 10, 1941, a Holstein cow weighing approximately 1600 pounds was brought to the veterinary clinic of Kansas State College with a history of having been passing dark-colored urine and of being off feed for several days.

Emaciation was evident and rumenation practically suspended. The temperature was 103.1°F. and the mucous membranes were somewhat pale. Upon rectal examination greatly enlarged kidneys and ureters were palpated.

A blood count revealed anemia (R.B.C. 6,000,000, hemoglobin 7.5) and increased W. B.C. count (10,000). A urinalysis revealed a large amount of hemoglobin and albumen. A stained slide of centrifuged urine examined microscopically showed cellular casts, pus cells, red blood cells, and bacteria which morphologically resembled *Corynebacterium renalis;* thus confirming a diagnosis of bacterial pyelonephritis.

The patient was put on sulphanilamide, 1500 grains daily, for nine days at the end of which period she died. On autopsy, the right kidney was found to be greatly enlarged and cystic and the left kidney somewhat enlarged. The right ureter was substantially increased in size, approximately three-fourths of an inch in diameter. The liver revealed parenchymatous degeneration and the heart showed albuminous degeneration. Some evidence of cystitis and metritis was noted. The postmortem findings indicated an ascending pyelonephritis.

Microscopic pathology of the kidney showed great infiltration of polymorphonuclear leucocytes, various areas of abscess formation and necrobiosis of the tubular cells. Little if any normal tissue could be found in the right kidney.

Blood counts and urinalysis were run on dates shown on accompanying charts. The blood picture on November 10 (the day the animal was first treated) was indicative of a bacterial infection and on that day the sulfanilamide therapy was started. Some benefit from its action was indicated in the blood picture and urinalysis of November 12, in that the total W.B.C. dropped to 4,600 and a great number of pus cells were noted in the microscopic examination of the urine. Further benefit from the sulphanilamide was evident on November 13 and 14 also. There was a shift to the left, indicating an unfavorable prognosis, in the blood picture of November 19. Possibly the rise of the hemoglobin content on that day was due to a transfusion of 500cc of whole blood two days earlier.

The possible infectious nature of this dis-

CHART I

Date	Eos.	Bas.	Myel.	Juv.	Stab.	Seg.	Lymphocytes L	Lymphocytes A*	S	Mono	R.B.C.	W.B.C.	Hb
11/10/41	2			1	5	47	6	1	37	2		10,400	7.5
11/12/41	1				4	38	8	4	42	5	4,900,000	4,600	7.5
11/13/41	1				4	39	11		42	5	6,250,000	9,800	8.0
11/14/41	1				4	41	6		43	5	4,675,000	5,900	7.5
11/17/41					3	39	7	6	41	4	5,800,000	10,600	8.5
11/19/41				6	13	41	15	9	15	1	7,050,000	22,000	12.0**

*Atypical lymphocytes (abnormal morphological or straining characteristic).
**Blood transfusion given on 11/17/41.

CHART II

Date	Color	Odor	Sp. Gr.	Litmus Reaction	Bile Salts	Albumen	Sugar	Ketone	Miscroscopic Examination
11/10/41	Brownish	Sharp	1.102	Basic	Neg.	Pos.	Neg.	Neg.	R.B.C.'s Mucous cellular casts.
11/12/41	Blood red	Strong ammonia			Neg.	Pos.	Pos.		R.B.C.'s vast number of pus cells.
10/13/41	Light red tinge	Slight ammonia				Pos.			Large amounts of fibrin, pus cells found in mass. Fewer R.B.C.'s and pus cells than on 11/12/41.
11/14/41	Reddish tinge					Pos.			Pus cells present but decreasing in number. Few R.B.C. present.
11/17/41	Blood red	normal	1.020		Neg.	Pos.			Fibrin, Bacteria, W.B.C.'s, R.B.C.'s.
11/19/41	Blood red	Cooked meat odor	1.022	Basic	Neg.				Many R.B.C. and W.B.C. No organisms or pus cells seen.

ease is shown by the fact that a bull from the same herd had been brought to the clinic early in the year and at that time his illness was diagnosed as bacterial pyelonephritis.

EDWARD J. MAHLER

Leoti, Kans.

Observations of Leptospirosis in California Dogs

Canine leptospirosis was discussed in a classical report by K. F. Meyer in the fall of 1939. Since that time leptospirosis is becoming more prominent in the field of veterinary medicine as well as that of public health. It is important, therefore, at this time to review the disease with its symptoms so that it can be more readily recognized and differentiated from other diseases with which it might be confused, especially the symptoms of the Laidlaw-Dunkin virus.

During the summer of 1941, the writer had an opportunity to observe several cases of canine leptospirosis. The animals were treated at the S.P.C.A. Animal Hospital, San Francisco, California. The diagnosis of the cases was made by S. Michaels, Chief Veterinarian for the S.P.C.A., and corroborated by agglutination tests. Twelve dogs were found affected having agglutination titers of about 1 to 1500 and higher—some as high as 1 to 30,000. Various types and breeds of dogs were infected including a pointer, a German shepherd, cocker spaniel, wirehaired foxterrier and mixed breeds.

The etiological agent of this disease is a spirochete, two species of which have been isolated from positive cases in dogs, *Leptospira canicola* and *Leptospira icterrohemorrhagica*. Some divide canine leptospirosis into two types, the icteric type, caused by the *L. icterrhemorrhagica* and the gastroenteritis type caused by the *L. canicola*. The two types are clinically alike with the exception of a generalized jaundice found in the first. It is not definitely known how the disease is transmitted, however, the spirochete has been isolated from rats and from the urine of infected dogs. It is claimed that water contaminated by rats is a prolific source of infection. Formerly symptoms of this disease were observed by clinicians and as the etiological agent was not known, the disease was called by many different names, such as: canine typhus, Stuttgart dog disease, dog plague, blacktongue, infectious hemorrhagic gastroenteritis, yellow jaundice of dogs, and yellows.

An affected dog is depressed and lies still much of the time

The following is a typical syndrome of canine leptospirosis:

History.—The dogs infected were usually two or more years of age, predominantly males, and had shown inappetence for two or more days. Emesis had been noticed occasionally during that time. The animals were depressed and lay still most of the time. However, they were surprisingly agile when allowed to exercise.

Symptoms.—The temperature of the animals when first received in the hospital was above normal, from 102.5 to 104.5° F. The conjunctivae were congested, usually with no discharge from either the eyes or nose. There was a peculiar fetid odor from the mouth, and occasionally a "pink coating" covering the teeth. The animals did not eat and occasionally emesis was observed. At first the bowels were either constipated or loose. This condition persisted from one to three days depending on how early in the attack the dog was presented for treatment.

The second or third day that the animals were in the hospital the following changes were noticed: The vomitus became tinged with blood and a bloody diarrhea supervened. The temperature then dropped one or more degrees in about 24 hours—usually showing from 103. to 100.5°F. In the cases

observed this drop in temperature was very characteristic of the disease. The odor from the mouth became noticeably more fetid and ulcers developed on the gums and mucous membranes of the oral cavity of some of the dogs. The animals were very depressed; the appetite in complete abeyance. At this stage the dogs were greatly dehydrated and emaciated, with the eyeballs noticeably sunken. In the next 24 hours the symptoms remained the same but became more aggravated. The temperature dropped another degree or two, reaching 99 and sometimes even as low as 97°F. The disease usually ran a fairly rapid course, the dog either died or showed definite signs of improvement in 7 to 10 days from the onset of symptoms. In some mild cases, however, slight symptoms persisted for several weeks before recovery was complete. In a small percentage of the cases of canine leptospirosis observed, in addition to the typical syndrome described, a jaundice was seen. This condition was attributed to the action of the *L. icterrohemorrhagica*. When jaundice was present an unfavorable prognosis was made, as this type of canine leptospirosis is usually fatal.

Diagnosis.—The history of the case gives the first clue to recognition of the disease. If the patient were an old dog, showing for a day or two, inappetance and emesis, high temperature, congestion of the conjunctivae and perhaps a fetid odor from the mouth, he was suspected of having canine leptospirosis. In such a case a blood sample was taken immediately and an agglutination test run. A dog was not considered infected with the disease unless the sera agglutinated in dilutions of 1 to 500 or higher. With any dog showing these symptoms, the possibility of his being affected with canine distemper or toxic gastric disturbances or blacktongue (in the event ulcers in the mouth were found) should be considered. If a dog does not respond to treatment for distemper or if the temperature drops quite low, a blood sample should be taken and an agglutination test made. Leptospirosis can be differentiated from blacktongue by the rapid course and great depression of the former.

Other methods of diagnosing the presence of the Leptospira have been reported, such as microscopic examination by dark-field illumination, guinea-pig inoculation and isolation, and culturing the organisms from the kidney and liver. While these last methods are accurate, a great deal of experience is necessary to get dependable results. The agglutination test is most satisfactory for all practical purposes.

Post Mortem.—On autopsy a gastroenteritis was always present. Aside from the enteritis, no characteristic lesions were found. In some of the animals a slight enlargement and congestion of the liver and spleen were observed. The kidneys were usually enlarged and showed some evidence of nephritis. In some cases petechial hemorrhages were found in the parenchymatous organs.

Treatment.—Saline and dextrose solutions were given subcutaneously and intravenously to overcome the dehydration and emaciation which was present in all of the animals. Intestinal protectives also were given. In addition large quantities of normal dog serum were administered. This treatment gave very discouraging results. However, hyperimmune leptospira serum of both of the strains mentioned was available from time to time and a 20cc dose of this serum gave remarkably good results in cases where the disease had not progressed too far.

ERNEST A. DIEGEL
San Francisco, Calif.

Canine Tuberculosis

The incidence of tuberculosis in dogs in the United States is not high. According to European veterinary writers from 1 to 2% of all dogs in Europe are affected with tuberculosis. From 10 to 30% of these dogs have the disease in a generalized form.

A male fox terrier was brought to the small animal hospital of Dr. G. B. Merrick of Elmhurst, Ill., with a history of having been very gentle and playful until the last six months since when it threatened to bite if picked up or if touched in the thoracic region. He tired easily and after exercising had severe coughing spells. The appetite was impaired and there was a continual loss of weight. He was the constant companion of a member of the family in an advanced stage of tuberculosis who later died from the disease.

The dog was hospitalized for observation and the following symptoms were noted: General emaciation, short dry cough, remittent type of fever, labored respiration, hair coat dry and lusterless, pain on percussion in thoracic region and lack of appetite.

A provisional diagnosis of tuberculosis was made and euthanasia advised since the animal was 12 years old and the owner did not want to pay for or bother with a tuberculin test. The diagnosis was supported by the following postmortem lesions: Adhesion of lungs to parietal pleura, caseous foci on lungs, bronchial lymph glands enlarged and containing a few calcareous deposits, enlargement of mesenteric as well as all other lymph glands of the body.

The abdominal cavity contained about 10 ounces of fluid and the kidneys, liver, and spleen were covered with what appeared to be miliary tubercular lesions.

Although the incidence of tuberculosis in the United States is low, one should nevertheless give it consideration in appropriate cases, especially in dogs that have contact with infected chickens, drink milk from infected cows, or that are companions of persons suffering from the disease.

ANTHONY J. PRASNIKAR

Mulberry, Kans.

A Pathological Testicle

Just as the sun was sinking behind the western hills, after a busy day during the castrating season, we came to a man who had two apparently normal colts which he wanted castrated.

Because the daylight was fast fading, I did not examine the colts before casting, which is my usual custom. After the first one had been securely tied and one testicle had been removed, I found that I had more on my hands than I had bargained for. In place of the other testicle I encountered a hard mass somewhat larger than a man's fist, incorporating what had been the testicle and the spermatic cord as well as some of the surrounding tissue. After considerable blunt dissection I was able to remove the mass in its entirety. The cavity was left open and no special after treatment was advised. The other colt proved to be normal, so we were able to finish the job and get home by the time the whippoorwills were calling to their mates.

When I saw the owner six weeks later he told me that each colt made a good recovery.

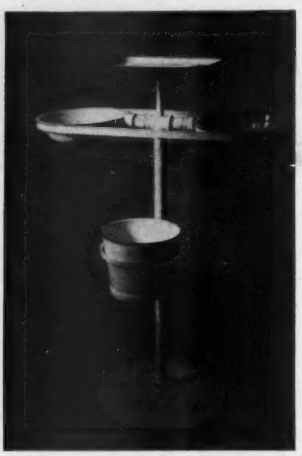
This is another argument in favor of casting animals for any surgical work. A slogan which I adopted early in life, and which has served me well, is "Tie 'em first."

REMBRANDT MORGAN

Winfield, W. Va.

Complicated Food Poisoning in a Dog

One evening a seven-month-old, male, wirehaired foxterrier was presented for treatment. The owner believed the animal to be suffering from distemper. This, however, was obviously not the case as its temperature was 100.4° F. with no suggestion of the distemper complex observable. The patient had appeared normal at noon



A considerable saving was made when the author made this combination basin and instrument stand a few years ago

when he was fed. On questioning the owner the following morning, it was learned that she had discarded several quarts of spoiled, home-canned cherries where the dog had access to them.

The animal walked cross-legged and very unsteadily, swaying from side to side; occasionally he fell, rising immediately; scoliosis was marked, with some degree of opisthotonos. There was evidence of extreme weakness, stupor, and impaired vision as the patient stumbled about, aimlessly walking into any obstacle. The pupils were dilated and did not constrict upon the application of a direct light. The animal was in a good state of nutrition. The respirations were accelerated; pulse rapid but small, weak and regular. The abdominal cavity was distended and a large nodular impaction of the intestine was palpable with no pain response. This obstruction contraindicated the use of apomorphine, and thus complicated the rational treatment for food poisoning.

One ounce of a saturated solution of magnesium sulphate was given *per os*, to retard absorption and to flood the intestines with fluid. This was followed in six hours by a copious defecation, the excrement containing more than 500 cherry seeds, and much foul fecal matter which, judging from the odor, was in an advanced state of putrefaction. Because of the condition of the animal enemata were not employed until about 12 hours following the medication; they produced more cherry seeds and foul fecal material. The entire symptom complex had disappeared during this latter period. The patient drank about one quart of water the following day. During this time all food was withheld but water was provided ad libitum. Complete recovery followed rapidly, and the patient was discharged two days after first seen.

H. D. PRITCHETT.

Teaneck, N. J.

Sodium Chloride Poisoning in Cattle

Recently the author accompanied Dr. E. W. Meads of Claremore, Oklahoma, on a call to see a cow. The following history was given: She had been lactating for several months, had been on pasture until, on the previous day, she had been turned into a threshed oat field.

We found the cow beside a pond in the pasture, prostrate and showing slight tympany and hypocalcemia. A tentative diagnosis of toxemia with possible hypocalcemia was made and 350cc of 20% calcium gluconate solution was administered intravenously. The stomach tube was passed to relieve the tympany and an attempt made to siphon some of the contents of the rumen.

During the course of the treatment the client had been looking over the remainder of the herd, which consisted of 27 Jersey cows and heifers, and a bull. Two cows could not be accounted for—later they were found in remote places in the pasture. Both showed marked symptoms of intoxication, evidenced by diarrhea and ataxia.

By this time the first cow was on her feet and showing much improvement, so she was given another intravenous injection of the calcium gluconate and a saline purgative via the stomach tube. Each of the other affected cows was subsequently given, intravenously, 700cc of calcium gluconate solution and a pound of saline purgative in five gallons of water. Much improvement was evident immediately following the injection of the calcium gluconate. The owner was advised to keep the cows in a dry lot during the night, because the oats which were spilled around the thresher seemed the most likely cause of the trouble.

At five o'clock the following morning we were again summoned to this farm where we found that two of the cows treated the previous day had died, another dying, and five others unable to rise. An immediate necropsy was performed and each case showed extensive gastritis and hemorrhagic inflammation in the abomasum. The remaining cow of the original three exhibited symptoms of hemorrhagic gastroenteritis as evidenced by a bloody diarrhea.

A diagnosis of mineral poisoning was made and a thorough search of the premises instigated. The only thing found which might have been the causative agent, was about 50 pounds of mushy, fine stock salt in a galvanized tub. One hundred pounds of salt had been placed in the tub about a month previously and the cows allowed constant access to it. A diagnosis of sodium chloride poisoning was made and each cow given 700cc of calcium gluconate intravenously, one ounce of bismuth subnitrate in three gallons of milk, and one gallon of mineral oil. The milk and oil were given through the stomach tube.

During the next 24 hours a total of 15 animals was affected, including the bull which later died. The State Veterinarian was called and a sample of rumen content was collected for laboratory analysis. The diagnosis was confirmed and the treatment above outlined was repeated as indicated. Milk and oil were administered twice a day and calcium gluconate given when nervous symptoms appeared.

During the course of the next three days 12 of the affected animals died and the three remaining were treated for a week, after which time they began to show marked improvement. A laboratory report indicated 0.5% sodium chloride in the rumen, which confirmed the diagnosis of salt poisoning.

The over indulgence was attributed to rain on the fine salt, which had melted it together; then a three-week dry spell in which the salt became hard and not readily edible. After a shower came the salt was made mushy enough so the cows could lick a handful at a time. All cows stopped lactating immediately and have been somewhat emaciated since.

F. D. RATLIFF

Claremore, Okla.

Comment: Questions propounded by the foregoing report may well ask why this amount of salt, well within the tolerance usually attributed to cattle, should have caused poisoning, and again why should cattle deprived of salt for only three weeks voluntarily consume enough to poison them when it commonly happens that cattle deprived of salt for a longer period and then supplied all they will eat are not harmed. Possibly, as is the case with hogs, cattle are less tolerant of salt when water is not available than when they have free access to it. In this report the availability or nonavailability of water is not mentioned, nor is the drinking of large quantities of it as would be expected in cases of overindulgence in salt. The small quantity of salt found in the rumen, it would seem, tends to negate, not confirm, the diagnosis. Obviously this is not a case for armchair diagnosis. At the same time, this on the spot diagnosis leaves, unanswered, many questions bound to arise in the minds of readers. When a diagnosis of sodium chloride poisoning in animals is made then is the time to begin the examination all over again to determine, if possible, why salt proved poisonous in that particular case if indeed such be the circumstance. It is a strong probability the second examination will reveal something missed in the first and change the diagnosis.

Book Reviews

Stedman's Practical Medical Dictionary. *By Stanley Thomas Garber,* B.S., M.D., University of Cincinnati, College of Medicine. Fifteenth revised edition; Semi-flexible leather-style binding; 1234 pages. The Williams & Wilkins Co., Baltimore, Md. Price: plain, $7.00; thumb indexed, $7.50.

Stedman's is an accepted standard medical dictionary. It is comprehensive, authoritative and reliable as a reference. Each word or term is readily discernable as they are all in bold black-face type.

Subjects in which there is an ever increasing fund of knowledge gleaned are brought up to date, i. e., vitamins, allergies, etc. Many changes in nomenclature are necessitated by the perpetual growth and evolution of medicine. For example: The terminology of bacteria has been made to conform with the classification proposed by the Society of American Bacteriologists. This revised practical dictionary gives concisely and clearly the explanation, derivation and pronunciation of all the correct terms currently used in medicine and allied sciences.

* * * *

The Virus; Life's Enemy. *By Kenneth M. Smith,* F.R.S., D. Sc., Ph. D. Cloth bound; 176 pages, 19 illustrations. The Macmillan Company, New York City, 1941. Price, $2.25.

Although the first disease (smallpox) for which a successful immunizing agent (cowpox vaccine) was discovered (Jenner, 1796), is caused by a virus and notwithstanding the first filterable virus was discovered 40 years ago (tobacco mosaic, Ivanovski, 1892) and a virus causing a disease of animals was isolated only six years later (foot-and-mouth disease, Loeffler and Frosch, 1898), most of the sum total of information concerning the pathogenic viruses has been developed within the past decade.

This decade, in the study of filterable viruses, corresponds to the decade of the 1890's in bacteriology. Developments and discoveries have come so fast that few other than investigators in that field have been able to keep up with the procession of new knowledge concerning viruses. Therefore, a work such as this that summarizes all that has been achieved down to last year in this fruitful field of investigation, is particularly welcome since it gives the average student of medicine, veterinary medicine or microbiology an opportunity to bring himself up-to-date on what has been accomplished and better able to understand future developments.

Sir Patrick Laidlaw stated the importance of the study of viruses in a single sentence: "It is abundantly evident that a proper understanding of virus diseases and viruses is essential for the future well-being of mankind." If any support of that statement be needed it is to be found in the pages of history. Through the centuries many of the most devastating plagues of both man and animals have been those due to filterable viruses. Smallpox is believed to have existed in China for 3600 years and in every country in Europe for a thousand years. So omnipresent was it in America in the Colonial Period that to meet an adult not marked by it was unusual. The death rate was always high in Pre-Jennerian days. A single infected passenger debarked in Mexico set off an epidemic that cost 3,000,000 lives, according to Zinsser. Yellow fever has ravished great populations for 300 years. In 1918-19 influenza destroyed more lives than were lost in the four and one-half years of World War I. Eighteen thousand died of influenza in London alone and six million in India. Measles, mumps, poliomyelitis, encephalitis and others take a perennial toll of health and life. Foot-and-mouth disease, psittacosis, fowl plague, hog-cholera, louping ill, the various poxes, equine infectious anemia, encephalomyelitis, rabies, etc., are just so many reminders of the hazard that virus diseases constitute to our animal husbandry and to an adequate food supply of the nation.

A distinct advantage of, *"The Virus; Life's Enemy"* is the concise and interesting manner in which the author summarizes a tremendous amount of material. Many more virus diseases of plants (135) than of animals are known, and the characteristics of plant virus are better understood than

are those of animals. This work deals with these simpler, better understood viruses first, thus establishing a foundation from which to attack the more occult viruses that produce disease in man and animals —a fortunate approach for the uninitiated. The sequence is admirable.

★ ★ ★ ★

Immunology. *By Noble Pierce Sherwood,* Ph.D., M.D., F.A.C.P., Professor of Bacteriology, University of Kansas, and Pathologist to the Lawrence Memorial Hospital, Lawrence, Kansas. Second edition; cloth bound; 564 pages; 56 illustrations, graphs and tables. The C. V. Mosby Company, St. Louis, Mo., 1941. Price, $6.50.

This second edition of Sherwood's Immunology is interestingly and critically written, being rather complete in the portrayal of the newest developments in the field. One of the two new chapters which have been added deals with serum reactions and is of especial interest as too are the three chapters dealing with the causes of supersensitiveness—allergies. The references are quite extensive which adds to the value of the book.

★ ★ ★ ★

Animal Sanitation and Disease Control. *By R. R. Dykstra,* Dean of the School of Veterinary Medicine, Kansas State College. Cloth bound; 558 pages; 91 illustrations. The Interstate Printers-Publishers, Danville, Ill. 1942. Price, $2.85.

The objectives of this work are stated in the preface to be (1) to impress the young mind with the importance of adequate veterinary service and the role the veterinarian has played in conserving America's immense livestock industry, as well as the favorable influence this has had upon human health and welfare, and (2) to lay a sound foundation for the prevention of animal ailments.

The text is stated to be for the teacher, the student and the sanitarian and not a discussion of the treatment of animal ailments for those not professionally trained in veterinary medicine.

The work is divided into 11 parts of several chapters each. Part I, Animal Health Factors; II, Animal Disease Factors; III, Methods of Disease Control; IV, Infections and Their Handling; V, External and Internal Parasites and Their Control; VI, Non-Infectious Ailments; VII, Infections and Communicable Ailments; VIII, Infections and Communicable Ailments of Fowl; IX, Parasites and Disease; X, Miscellaneous Information, and Part XI, Livestock Sanitary Bureaus, Boards and Commissions and the Veterinarian.

A sincere effort is made throughout the work to impress upon the reader that the animal disease problem is far too complex for lay management and the economy of employing the professionally trained veterinarian for handling it. On this account "the matter of treatment has been purposely avoided."

It is a work the veterinarian can recommend with confidence to intelligent, progressive livestock raisers.

★ ★ ★ ★

The Physiology of Domestic Animals. *By H. H. Dukes,* D. V. M., M. S., Professor of Veterinary Physiology, New York State Veterinary College, Cornell University. Fifth revised edition; cloth bound; 721 pages, 168 illustrations. Cornstock Publishing Co., Ithaca, N. Y., 1942. Price, $6.00.

Earlier editions of this excellent work were reviewed in some detail in these pages.[1] Much of the present edition has been rewritten, and a number of subjects not included in earlier editions have been added to the text. The amount of applied material has been increased, many changes made in the illustrations and a good deal of anatomical discussion of the nervous system omitted.

The present edition contains chapters on the Physis-Chemical Basis of Physiological Phenomena by E. A. Hewitt, Endocrine Glands and Reproduction by S. A. Asdell and a foreword by H. D. Bergman. New text matter by the author includes discussions of digestion in the chicken, respiration in birds, urine of the chicken, reproduction in the fowl and oxidations.

Being the only available textbook in the English language on veterinary physiology it is indeed fortunate that it can be recommended unhesitantly to veterinarians and students of veterinary medicine.

[1] *Vet. Med.* 1933, 27:12, p. 518; 1936, 31:1, p. 42; 1937, 32:12, p. 586.

★ ★ ★ BUY WAR SAVINGS STAMPS AND BONDS

Mammalian Structure. *By Charles J. Wideman,* S. J. Department of Biological Sciences, Loyola University. Spiral, flexible imitation leather binding; 60 pages, 33 illustrations. Loyola University Press, Chicago, Illinois. 1941. Price: $1.20.

This work is essentially an atlas of cat anatomy with directions for dissection. The excellent illustrations were made from actual specimens, and serve well for a brief review of the anatomy before operations on this animal. The illustrations include drawings of the bones, superficial muscles, visceral organs of the abdominal and thoracic cavities and of the central nervous system.

You may obtain any book reviewed in this department by remitting the published price to the Book Department of VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago, Ill.

War Medicine. A symposium edited by *Winfield Scott Pugh,* M. D. Commander (M. C.) U. S. Navy, Retired. Formerly Surgeon City Hospital, New York City. Cloth bound; 565 pages, illustrated. Published by the Philosophical Library, New York City, 1942. Price $7.50.

This excellent and timely work will prove most useful, containing as it does a digest of the voluminous literature of World War I and also the literature growing out of experiences during the intervening years. In addition it contains an extensive review of the, as yet, meager medical reports on casualties in the present conflict.

Discussions from 65 authorities who have achieved conspicuous success in their respective fields, are included in this symposium. Of course they deal primarily with the work of the medical officer in combatant forces and of the physician in bombed communities. Nevertheless much of it, certainly much of the 325-page section on military surgery, is more up-to-date and more practical for the veterinarian than anything to be found in veterinary literature on the subject of wound treatment. Not a little of the section on general medicine, e. g., the discussions of the causes, pathology, and treatment of shock, of nutrition, the use of blood substitutes, recognition and first-aid treatment of gas casualties, allergy, etc., likewise contains useful information for veterinarians. Practically all the remainder of the text is generally informative and grippingly interesting at this time when war absorbs the primary interest of millions.

A few quotations are illustrative of the scope and style of the discussions:

In the spring and summer months of 1918, when the weather was comfortable and our soldiers were fresh from training camps, shock occurred only among the severely wounded. When the rainy season opened and our troops were fighting in the Argonne sector, with bogged transportation, inadequate food and shelter and loss of sleep, cold and hunger became almost major factors in the production of shock, regardless of the type of injury received.

Immobilization is a well established principle in the treatment of fractures but its benefits in soft tissue wounds are not so generally appreciated. Complete immobilization in soft tissue injuries not only facilitates healing but relieves pain, prevents deforming contractures and facilitates nursing care.

The fundamental question as to whether the inflammatory reaction to healing and infection is the result of bacterial action or is a defense mechanism on the part of the host, has never been satisfactorily answered. If the former, then treatment should combat the reaction and, if the latter, therapeutic measures should augment the reaction.

The application of heat to most potentially infected wounds by the use of hot packs, hot water bottles or light candles is almost universal but may be very dangerous. . . . Refrigeration in the presence of vascular damage probably is more rational than the use of heat.

From time immemorial, men have searched for the magic colored solution which will kill bacteria but not harm tissues . . . the practice of pouring these solutions into defenseless wounds simply increases the tissue burden and should be discontinued.

This is a colitis ridden nation, due largely to the fad of eating in their raw state, fruits and vegetables that require cooking to make them fit for human consumption.

There are no incompatibles in foods. An allergy or other idiosyncrasy alone accounts for certain individuals being adversely affected after eating certain food combinations.

In attacking the infections we were often attacking the patient as well and about the time the infection was in retreat the patient was about ready to surrender also.